














John Hardy

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# ELEMENTS OF MEDICINE.

VOL. II.

ON MORBID POISONS.

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## P R E F A C E.

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THOUGH far from exhausting the subject, the present volume completes that amount of evidence which seemed to me necessary to demonstrate the doctrine of the specific actions of morbid poisons—a doctrine which has of late found many advocates both in this country and on the continent. My experience since the publication of the first volume has afforded me many remarkable instances of the contagious nature of typhus fever, as also many additional proofs that the action of the typhoid poison on the mucous membrane of the alimentary canal is by no means uniform, and, indeed, that it is often altogether wanting. I have likewise seen many other striking examples of the spread by contagion of erysipelas. Looking to the number and importance of the subjects now treated, it is impossible for me not to feel a painful consciousness that full justice has not been done to them, but enough, perhaps, has been accomplished to show

the propriety of separating this interesting class of disease, singular in its laws and peculiar in its treatment, from the great body of medicine with which it has been so long confounded, and thus a step may have been gained in improving the study of practical medicine.

Bedford Place, Bloomsbury.

March 22nd, 1841.



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## VACCINIA OR THE COW-POX.

This poison is simply contagious, and produces a single vesicle at each point of puncture. This vesicle undergoes certain mutations, and runs a given course of fourteen days. A slight fever generally accompanies the latter stages of the local affection.





## OF THE POISON OF THE COW-POX.

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THIS poison is immediately derived from one of our domestic animals, and has the singular property of exerting not, only a powerful, but also a beneficial, influence over the human frame; destroying its susceptibility to the most virulent contagion to which it is liable. The antivariolous properties of this wonderful agent had been, for a considerable time, popularly conjectured in different parts of England; but the demonstration of this great law, and its practical application in medicine, is entirely due to the genius, energy, and moral courage of Dr. Jenner. This great subject occupied the thoughts of this eminent individual in early life; but it was not till after many years' profound meditation, that he ventured, on the 14th of May, 1796, to make his first experiment. It was eminently successful; and after much further investigation, he published, at last, his "Inquiry," in the year 1798; showing that the vaccine disease had, in every instance within his experience, proved an infallible preventative of the small-pox. Few persons live to witness the full success of their discoveries, but Jenner had the good fortune to see this great principle admitted, and a practice, which was to influence, for good or for evil, the lives and happiness of all mankind, adopted with unprecedented unanimity. Vaccination was, after a short interval, generally received in this country; and, in two years, it had passed into Hanover, Germany, Russia, France, Italy and Spain, and thus spread over the whole continent of Europe. It also reached, in an equally short time, India and America,\*

\* Vaccination was practised in California, as early as 1806.—*Beechey's Voyage to the Pacific*, p. 396.



and ultimately penetrated to the remotest parts of the globe. No antidote, indeed, was ever more ardently desired, or so universally, gratefully, and even unreflectingly received. An experience of forty years, has gathered round this interesting subject; the enthusiasm which attended its introduction has subsided—all interested opposition is withdrawn, and we may now hope, with some degree of calmness, to estimate its results. It is to be lamented, however, that the data on which its advantages or disadvantages must be founded, though numerous, are often contradictory and imperfect—still, supposing they admit the deduction of a general principle, it may be affirmed, as proved by a multitude of facts, that, although the views of Jenner may not have been altogether established—nor the immunity from the small-pox so entire and complete as he had anticipated, yet his wonderful discovery has not only, in a remarkable degree, diminished the mortality from the most pestilent contagion of modern times, but has indirectly improved the health, lengthened the days, and increased the happiness of the inhabitants of every country of the earth. The phenomena and laws of this remarkable disease, open many paths for speculation, all of them interesting, and all deserving to be explored.

*Remote Cause.*—In reasoning on the origin of the vaccine poison, the natural inference seems to be that, first discovered in the cow, it had originated in the cow—but popular opinion has assigned a remoter cause, or the greasy heel of the horse. This hypothesis was adopted by Dr. Jenner, “the skin of the horse,” he affirms, “is subject “to an eruptive disease of a vesicular character, showing “itself most commonly in the heel,” and that “the vesicles “contain the *specific fluid*.” “It is the ill-management of the “horse in the stable, which occasions the malady to appear in “the heel rather than in other parts; for,” he adds, “I have “detected it with a sore in the neck of the horse and in the “thigh of a colt.”\* This inferred connection of cause and effect, between ‘the grease’ and the cow-pox, he made many

\* Baron’s Life of Jenner, p. 242.

attempts to prove ; but difficulties of a nature not easily overcome, interfered, we are told,\* with his success, and all his experiments failed. Jenner's opinion, however, remained unchanged. He even sent some equine matter to the National Vaccine Institution for use in that establishment ; and, at one time, proposed "*variolæ equinæ*" as the proper pathognomic name of the disease.

The presumptive, as well as the direct evidence, is, however, very strong against this hypothesis. The grease, for instance, is a sporadic disease, unattended with fever ; affects locally, the heel of the horse with a disorder, running no given course, and which is not contagious among its own kind. On the contrary, the cow-pox is epidemic, greatly contagious, attended with fever, and with local phenomena on the teat, which run a definite and given course. The symptoms of the two diseases are, therefore, totally distinct. This supposition, also, is still further disproved by direct experiment ; Dr. Woodville, Mr. Coleman the talented Professor of the London Veterinary College and others, have inoculated the cow with matter taken from the greasy heel of the horse, in all its stages, but all have equally failed in producing the cow-pox. The human subject has also been inoculated with the matter of "the grease," and also with other morbid secretions from the horse, but no disease similar to the cow-pox has resulted ; for these reasons, therefore, this hypothesis has been very generally abandoned.

Another hypothesis, peculiar, perhaps, to Dr Jenner, respecting the remote cause of the disease, is, that the cow-pox, "the grease," and the small-pox, are only modifications of the same distemper ; the originally potent matter being refined by passing through the system of the horse, then of the cow, and "reaching us in a purer form than had been current among us for twelve centuries."† This triple identity of the variolous disease, likewise is no longer entertained. The warmest admirers of Jenner are agreed, that in this hypothesis.

\* P. 136.

† Vol. ii, p. 15.



“the error consisted in believing that this affection was ‘the  
“grease’ and required to be transmitted through the cow to  
“give it efficacy.”

It is stated, however, in the able Report on the Present State of Vaccination, as Jenner’s “last hypothesis”—“his un-  
“alterable conviction, that how different soever they might be  
“in some particulars, the cow-pox and the small-pox were in  
“reality identical;” that the cow-pox was not “an antidote,  
“but the substitution of a mild species of small-pox, instead of  
“a malignant sort, or of a cow small-pox, for human small-  
“pox.” This theory would seem most easy of proof, but every  
body admits, that although many cows have been clothed with  
blankets taken from the bed on which small-pox patients  
and just died, and have been inoculated in every possible way,  
yet, not only has the small-pox not been satisfactorily pro-  
duced, but this failure of their experiments has rendered it  
probable that the cow was unsusceptible of the disease.

This was the state of the question, when Mr. Ceely inoculated  
three sturks on the 1st of February, 1839, with small-pox  
matter on the *labium pudendi*; and as the result induces him  
to conclude that the vaccine and variolous poisons, according  
to the conjecture of Jenner, are identical, it will be necessary  
to give some particulars of the experiments. In the first, a  
red and white sturk,\* he made seven punctures, and intro-  
duced fourteen points charged half their length, near the left  
side of the vulva, and below it, he inserted also two setons  
charged with small-pox virus from the same subject, at the  
same time. “During the first five or six days,” says Mr. Ceely,  
“there seemed some chance of a result in the tumefactions of  
“the punctures, but on the ninth day, as this result seemed  
“very unlikely, I determined to ascertain the susceptibility of  
“the subject to the vaccine, and, therefore, vaccinated on the  
“right side of the vulva, in seven punctures, with fifth, sixth,  
“and seventh day lymph on fourteen points, from a young  
“child; and below the vulva, in four punctures, with eight  
“points. The next day, to my great surprise, that which I

\* Ceely on Variolæ Vaccinæ, p. 98.

“had considered as an inert tubercle, had assumed the form of  
“a vaccine vesicle; and the vaccine punctures, too, all looked  
“red.” From this period, it appears, that the one varioloid tubercle, and all the vaccine punctures pursued the usual course of the vaccine disease, if not absolutely *pari passu*, yet nearly so; the variolous vesicle being in a “highly vigorous state,” when the vaccine punctures were in a “palpably vesicular state;” while “the fifteenth day of variolation, and seventh  
“of vaccination, was the period of greatest development of all  
“the vesicles; for, on the sixteenth day, decline in all was  
“manifest, which was too palpable in the seventeenth to be  
“doubted.”

This case is full of interest, but it is questionable whether it can be considered as, in any degree, conclusive of the identity of the vaccine and variolous poisons; for, as the vesication of the variolous tubercle was not observed till the day after the vaccination, it must be doubtful whether the tail of the animal, in almost constant motion, may not have anointed the inflamed part with some of the vaccine matter. The further results, also, of this experiment are singular; lymph was taken on the tenth day from the variolous vesicle, by Mr. Taylor; who, in opening it, punctured the skin of his own hand, between the thumb and fore-finger. “On the  
“fourth day afterwards,” says Mr. Ceely,\* “he directed my  
“attention to a hard deep red papular elevation on the spot,  
“stating the cause, and, at the same time, assuring me that he  
“had been vaccinated in infancy, and had subsequently had  
“modified small-pox. On the fifth day, there was a papulo-  
“vesicular elevation, surrounded with a dark red areola, and  
“much uneasiness in the part. In the evening, head-ache  
“and other febrile symptoms appeared, with roseola, and fiery  
“red papula on the face, neck, trunk and limbs, exhibited  
“ash-coloured summits, and, through the lens, appeared to  
“have slight central depressions. On the seventh day, it  
“was manifest that the disease had reached its acmé on the  
“previous day. The areola was diminished, the vesicle was

\* P. 119.



“more apparent, some of the papulæ presented light straw  
“coloured summits, and the roseola was declining, with an  
“abatement of the febrile symptoms, and a diminution of the  
“soreness in the axilla. On the eighth day, all these changes  
“were more obvious, although he was not free from head-  
“ache; the papulæ were more yellow, and some were desic-  
“cating—the vesicles were larger but less active, and the  
“areola was comparatively pale. This was evidently modified  
“vaccine in a sanguine habit with roseola and vesicular,  
“or vaccine lichen.” This case is exceedingly remarkable, as  
five children were vaccinated, each with four points, charged  
with matter from the same vesicle, when out of the twenty  
punctures, only six vesicles were produced, but without any  
general eruption. This anomaly must create some scepticism,  
as to the disease under which Mr. Taylor actually laboured, or  
whether, as he had, a fortnight before, been exposed for hours  
to the infection of the small-pox, it might not have been one  
of the singular variations of that disorder, and if so, how  
difficult is it to avoid error in drawing conclusions from  
medical experiments.

The second experiment\* is liable to no such difficulty. A white sturk was inoculated in seven punctures, near the left side of the vulva, and on the under fold of the labium of that side, with fourteen points, charged, as in the first experiment, from the same source, and with two setons charged in like manner, near and below the vulva. The progress of these punctures was so little satisfactory, that on the 15th of February, the sturk was re-inoculated with small-pox virus of the seventh and eighth day, by capillary tubes forced into eight punctures, which were deluged with it, the punctures being afterwards irritated with points deeply charged with the same, which were suffered to remain in the punctures. On the fifth day, the purplish or livid pimples, so much like the natural or casual vaccine on the thin skin of the teats, at this stage announced the success of the operation on the lip of the vulva. Four punctures, however, alone

\* P. 101.

succeeded, and these are considered by Mr. Ceely, to have ran the usual course of the vaccine disease. The animal was subsequently inoculated, both with variolous and vaccine matter, but no result followed. Lymph was also taken on different days, and used with different degrees of effect, in vaccinating eleven children, but when successful, produced perfect vaccine vesicles. The experiment on the third sturk entirely failed.

This second case of Mr. Ceely is highly valuable, and is the only one on which the proof of the identity of the vaccine and variolous poisons can be rested, but even this is imperfect, the parties vaccinated not having been, in any instance, tested with variolous matter. Besides, a single instance of the occurrence of the vaccine disease after inoculation, at a time when cow-pox prevailed to a considerable degree among the cattle in the neighbourhood, is not sufficient to establish the point at issue, and to decide a dispute which has existed for nearly half a century. The sources of error are so endless in medicine, that no fact can be considered as proved that has not been verified by repeated experiment; and, consequently, the question seems to rest almost in the same state in which Mr. Ceely found it.\* It is impossible, however, not to state that the thanks of the profession are due to Mr. Ceely, and to hope that, as he has done more to advance the natural history of vaccination than any other individual since the days of Jenner, he will continue his valuable labours in elucidation of this difficult subject, till every doubt is removed.

The circumstances requiring the repetition of these experiments are of no common order, for how is it possible to understand the small-pox virulent as it is in man, should, on its being transmitted to the cow, immediately assume a different character, and follow an entirely different series of laws; that—from being pestilential, it should become mild—from being multiplex, it should change to a

\* Mr. Dalton produced ulceration of the teat by rubbing small-pox matter on it, and he vaccinated with the matter obtained from the ulcers; and for a time believed he had produced a mild small-pox; but, on testing the children with variolous matter, they all took the disease.



local disease, limited to a single spot—from being contagious and infectious, it should be only simply contagious—from being epidemic, it should be sporadic—and from being attended with a dangerous and fatal fever, should be marked by hardly any sensible febrile attack whatever. These differences are far greater than are observed in mere differences of species. There is no analogy, likewise, with any other known disease, to render it probable that any poison is thus mitigated by its transmission through the brute animal. As the facts, therefore, to be proved, are not warranted by reason, the experiments to establish them must be most abundant. Those who imagine that the mere assertion of the identity of the two poisons will tend to pacify the mind of the public on this great question are in error, for the great mass of unprofessional persons are indifferent about the affinities of the two diseases, and are careless whether the two poisons are identical, or the one be the antidote to the other. They look merely to results, and are satisfied if they may consider the cow-pox as an effectual protection from the small-pox, and as the efficient substitution of a mild, for a disgusting, malignant and fatal disease. In the absence, then, of more positive evidence than we at present possess, the more probable hypothesis, therefore, is, that the cow-pox is a disease, *sui generis*, and results from the action of causes on the animal primarily affected, which are unknown, and are altogether inappreciable. It may also be affirmed, that the poison of the cow-pox is not the antidote to that of the small-pox, for the diseases they give rise to are capable of co-existing in the same individual—likewise, that it has the property of rendering the system either permanently, or for a greater or less extent of time insensible to the action of its own, as well as of the variolous poison. It will now be necessary to give some account of the disease as it occurs in the cow, and afterwards to trace the effects of its poison on the human subject.

It is singular, looking to the deep interest connected with the subject, that we are still unacquainted with the exact nature of the vaccine disease as it occurs in the cow, for Dr. Jenner has left us no drawing, and only a very imperfect

description of the eruption from which he vaccinated. The difficulties which surround this question will be seen when it is stated, that Dr. Heim contends that the cow is subject to no less than eight distinct forms of cow-pox, five of which are communicable to man. Indeed, there is no sort of agreement among authors in their description of the cow-pox as it occurs in the cow; for some describe it as a local disease of the teat, void of fever—others, that it is a local disease with fever;\* the secretion and consistency of the milk being changed or diminished—while Mr. M<sup>c</sup>Pherson speaks of it, as a particular disease covering the whole body, the mouth and fauces being, in some instances, one mass of ulceration, extending, in all probability, to the stomach and intestinal canal—the animal, at the same time, labouring under much distressing cough and considerable fever. The mortality from this class of disease, he estimates from fifteen to twenty per cent.† Dr. Jenner is even supposed to have obtained his first lymph from an epizootic, in which the eruption originally extended from the extremity of the tail to the base of the horn. In this difficulty, the experience of Mr. Ceely is of great value, and his work bears the impress of his having paid much attention to this subject. As his account, however, of the topical symptoms of the cow-pox is extremely diffuse, and occupies no less than twenty-five pages, it is impossible to do more than to extract his general description of the phenomena of the natural disease as they occur in the cow :

“For the symptoms in the early stage,” he says, “we are  
“almost always compelled to depend on the observations or  
“the statements of the milkers. They state, that for three or  
“four days, without any apparent indisposition, they notice  
“heat and tenderness of the teats and udder, which are  
“followed by irregularity and pimply hardness of these parts,  
“especially about the bases of the teats, and adjoining  
“vicinity of the udder—that these pimples, on skins not  
“very dark, are of a red colour, and generally as large as a  
“vetch or a pea, and quite hard—that in three or four days

\* Bousquet, p. 14—250.

† Baron's Life of Jenner, vol. II., p. 228.



“many of these having increased to the size of a horse-bean,  
“milking is in general very painful to the animal, the tu-  
“mours rapidly increase in size and tenderness, and some  
“appear to run into vesications on the teats, and are soon  
“broken by their hands ; milking now becomes a trouble-  
“some, and occasionally a dangerous process. It is very  
“seldom that any person, competent to judge of the nature  
“of the ailment, has access to the animal before the appear-  
“ance of the disease on others of the herd, when the cow,  
“first affected, presents on the teats acuminate oval or  
“globular vesications, some entire, others broken, not un-  
“frequently, two or three interfluent. Those broken have  
“evidently a central depression with marginal indurations ;  
“those entire, being punctured, effuse a more or less viscid  
“amber-coloured fluid, collapse, and, at once, indicate the  
“same kind of central and marginal character. They appear  
“of various sizes, from that of a pin’s head, evidently of later  
“date, either acuminate or depressed to that of an almond  
“or a filbert, or even larger ; dark brown or black solid  
“uniform crusts, especially on the udder, and on the base of  
“the teats are visible at the same time ; some much larger  
“are observed on the teats, these, however, are less regular  
“in form and less perfect ; some are nearly detached, others  
“quite removed, exhibiting a raw surface with a slight central  
“slough. The forms of the crusts on the udder are either  
“circular or ovoid, slightly acuminate or depressed, and the  
“crusts seem imbedded in or surrounded with more or less  
“indurated integument. On the teats, the crusts are circular,  
“oval, oblong or irregular ; some flatter, others elevated or  
“unguiform, several regular, some thin and more translu-  
“cent, being obviously secondary. The appearance of the  
“disease in different stages, or, at least, the formation of a few  
“vesicles at different periods seems very evident. The  
“swollen, raw and incrustated teats, seem to produce uneasi-  
“ness to the animal only while subjected to the tractions of  
“the milkers, which it would appear are nearly as effectual  
“as usual.\*

\* Observations on the Variolæ Vaccinæ, p. 22.

“The normal course of the natural and casual disease,\*  
“is completed in about twenty or twenty-three days, viz : four  
“days in the natural form, from the probable period of invasion ;  
“(in the casual, three or four from the presumed period of  
“incubation) to the appearance of the eruption—six or  
“seven from this period to the full development or perfect  
“maturation of the vesicle—five or six from its decline to per-  
“fect desiccations—five or six from this period to the sponta-  
“neous separation of the crust.

The anatomical structure of the vesicle, which is described as similar in appearance to that in the human subject, is as follows : “The structure of the vesicle just before it  
“attains maturity, shows that its colour, indurated margin and  
“central depression, depend on the existence of an adventi-  
“tious membrane, formed in the corion, and secreted by the  
“papillæ. It is raised in the form of a zone, and is intimately  
“connected with the epidermis—it has a cellular structure,  
“in which is secreted and contained a clear viscid lymph.  
“The cells appear to be arranged in two concentric rows,  
“are separated from each other by whitish radiating parti-  
“tions, which at their converging extremities are united by  
“a central membranous band. The dusky central spot  
“which marked the first change of the pimple into the  
“vesicle, and which has now become darker and more dis-  
“tinct, seems to be caused by a greater or less degree of  
“separation and desiccation of the epidermis stretched over a  
“crypt-like recess, which contains a small quantity of  
“semi-concrete lymph-like matter, occasionally a turbid  
“opaque fluid. About the fourth or fifth day of the eruption,  
“or two days before the decline of the vesicle, there often  
“appears at its base a red circle, which gradually increases  
“in extent till that event occurs. During this period, the  
“lymph within the cells having become more abundant and  
“less viscid, and somewhat opaque, bursts and breaks up  
“the cells and their connecting band, separates the epidermis  
“from its attachment to the subjacent adventitious mem-  
“brane, and the vesicle losing its central depression, becomes  
“acuminated, presenting a conoidal central form. The



“lymph soon acquires a pale straw-colour or amber hue,  
“and speedily becomes more serous, turbid and opaque.\*

“The *areola* differs in colour and extent, and is often  
“entirely absent. In thick white skins, at its acmé, it is of a  
“pale rose colour, and seldom, when the vesicles are distinct,  
“more than three or four lines in diameter. In dark skins,  
“it is entirely absent, except when they are very thin, in  
“that case, it will appear as a circular line of a dull vermillion,  
“a reddish brown, a tawney or a coppery colour. When  
“absent, the erythematous, inflammation of the superficial  
“surrounding and subjacent tissues, of which it is one of  
“the signs, is still indicated by others, viz: heat, tenderness  
“and circumscribed induration. This induration is greater  
“when the tissues are thick and compact, though more  
“circumscribed and better defined; when they are thin and  
“lax, it is less regular and more diffuse. The former is the  
“case on the udder—the latter, on the teats.

“The vesicles are found principally on the teats, but are  
“often seen on the udder, especially in the brown and  
“naked part. They are very frequent around the base and  
“neck of the teat, and also on the body, now and then on  
“the apex. The number varies considerably, occasionally one  
“or two, not unfrequently twenty, thirty, or even sixty  
“dispersed about the teats and udder.

“Perfect vesicles may be seen scarcely much larger than  
“a pin’s head, and not unfrequently as large as a sixpence,  
“sometimes even larger. On the same animal, they often  
“appear as large as a vetch, a pea, a horse-bean; the latter  
“is a common size. In general, the more numerous they  
“are, the smaller they are. The form of the vesicles is  
“circular or oval, now and then in some parts irregular,  
“almost invariably circular around the base and neck of the  
“teats. The oval form is to be found on the udder, but  
“principally on the body of the teats. Its axis seems to be  
“determined, as well as its form, by a fissure or furrow  
“on the skin. When the skin is thin, vascular and much  
“furrowed and corrugated, which is often the case on the  
“teats of red cows, the form is irregular, more especially  
“when the vesicles are coalescent.

“The *colour* of the vesicle varies according to the age of  
“the vesicle, and is again modified by the colour and texture  
“of the skin. At an early period, from the first to the  
“third day, when the skin is thin and vascular, and the  
“colour fair, that of the vesicles varies from a fluid red to a  
“deep damask or purple. At a corresponding period, in  
“thick skins of a light colour, that of the vesicles is less  
“intense but often bluish. In thin skins very dark, a degree  
“of redness is still visible, often a light damask or bright  
“rose; but when the skin is dark, the colour is more ob-  
“scure. In general, the colour of the vesicle is lighter than  
“the surrounding pigment, but in all cases, there is presented  
“a striking metallic, glistening aspect. As the vesicles ad-  
“vance, the depth of their colour proportionately dimi-  
“nishes. It is, however, always darker at the base than  
“on the surface, especially on the elevated border, where it  
“is also more glistening. In the fairer skins, the glistening  
“lustre resembles that of silver or pearl, and some vesicles,  
“where the skin appears diaphanous, have a bluish white or  
“pale slate colour, particularly towards their centre. In very  
“dark skins, the colour of the vesicles is occasionally reddish  
“at their base, and they have their surface much lighter than  
“their ground, glistening with the lustre of mica or of lead.  
“When fully developed on the light coloured skins, the  
“vesicles vary from a bright to a pale rose or flesh colour,  
“which is deeper at the base, and blends softly with the  
“varying tint of the areola, when present, or terminating in a  
“narrow rose coloured ring when that is absent. At this  
“period, even in the dark reddish brown skins, the raised  
“and tense margins of the vesicles, have a rosy hue, which  
“increases towards the base, where it terminates, except in  
“very thin skins, insensibly, in a deep tawny hue. The  
“bluish, bluish white, grey, or slate coloured tint of the de-  
“pressed surfaces of some vesicles is most apparent, and the  
“metallic lustre is most conspicuous in all. But these are  
“not all the variations of colour met with, there are others,  
“some of which are not unfrequent. On white skins, when  
“very thick, and at the same time much corrugated, the  
“vesicles have a dull white or cream colour.



“After the tenth day, the vesicle loses its plumpness, its  
“warmth of colour, its glistening aspect, its areola, its indurated base, and, in general, when undisturbed, rapidly subsides. Those which early exhibit the central crust, in a  
“day or two after this period, have their centres completely occupied with its oval, or circular, or irregular form, and  
“scabrous substance. By the thirteenth or fourteenth day, this crust is at its greatest magnitude, is of a brownish  
“black colour, and adheres more or less tenaciously to the epidermis and skin beneath, and is bounded, almost always, by some traces of indurated margin, even at the twentieth  
“or twenty-third day, when it separates and leaves a smooth cicatrix, slightly depressed, of a white colour on dark skins, but often of a pale rose on lighter coloured skins.\*

Such are the topical effects of the vaccine disease, as seen in the cow, and “a due consideration of all these phenomena, and their associated circumstances,” says Mr. Ceely, “would make it appear, therefore, that the disease in the cow, has few, if any anomalies by which it may be distinguished from the disease observed in man.”

As to the constitutional affection, in the majority of instances where the animal was primarily diseased, Mr. Ceely says, “I could not learn that food was refused, or any palpable febrile indications were noticed. The only symptoms noticed in seventy-eight cases were, that the udder and teats were tumid, tender, and hot just before the disease appeared—also in the animal casually affected, there is rarely any manifestation of fever, or of constitutional disturbance. It is sometimes observed to diminish the secretion of milk, and, in most cases, does not affect the amount artificially obtained; beyond which, and the temporary trouble, plague, and accidents to the milk and milkers, little else is observed; the animal continues to feed and graze as well as before.”

The habits of this poison as seen in the cow, are, that the disease is occasionally epizootic or prevalent, at the same time, at several farms at no great distance from each other, but

more commonly sporadic, or nearly solitary. It appears only at long intervals, so much so, that Talleyrand, residing as ambassador at the British court, writes in 1831 to the French government, desirous of obtaining vaccine matter from a new source, that after the fullest enquiry, he found the disease had not been seen in this country for more than twenty years. Indeed, so irregular is its appearance, that Mr. Ceely states that he has known it occur twice in five years, in two contiguous farms in Buckinghamshire; while at a third adjoining dairy, it had not been known to exist for forty years. It is said to appear most commonly about the beginning or end of spring, rarely during the height of summer, but has been seen at any period from August till May, or the beginning of June.\* It is generally considered to occur primarily in the milch cow, and that it is propagated to the dry animal by the hands of the milkers. Mr. Ceely, however, doubts this as an invariable rule, although he has frequently seen sturks, dry heifers, dry cows, and milch cows, milked by other hands, grazing in the same pastures, feeding in the same sheds, and in contiguous stalls, remain free from the disease.

One other remarkable circumstance, however, connected with the disease in the cow, is that it is peculiar to some countries, and to certain districts of the same country. On the first publication of Dr. Jenner's discovery, it was much sought for in England, but found to exist in only eighteen counties, most principally in Devon, Dorsetshire and Somersetshire; in Hampshire, Buckinghamshire, Middlesex, Wiltshire, Staffordshire and Norfolk. It has been found, also, among the cattle of Lombardy, Holstein, Persia, the southern parts of America, and in India. It is singular, however, that it was altogether unknown in France till 1836, when, by an inexplicable *bizarrerie*, it was discovered in three separate districts, at a short distance from each other, or at Passy, near Paris, at Amiens, and at Rambouillet.† This latter fact is a strong argument against the disease being

\* Ceely, on Variolæ Vaccinæ, p. 14.

† *Bulletin de l'Académie de Médecine*, tom. i, p. 509.



the small-pox, and of the cow being affected by the human subject, for, on such an hypothesis, it is impossible to assign any reason why the disease should be so often communicated in England, and so seldom in France. The poison is capable, also, of producing the cow-pox in many animals, not naturally liable to it, by vaccination, as the dog, the goat, the she ass, the sheep, and, perhaps, the horse. Its most important transmission, however, is to man, and matter taken from the cow produces the peculiar disease termed cow-pox in the human subject; and, reciprocally, matter taken from the human subject, produces, by retro-inoculation, the cow-pox in the cow,\* each puncture giving rise to one pustule, and no more.† The laws of the cow-pox virus, when introduced by vaccination into the human system, are as follows:

*Predisposing causes.*—The susceptibility to this poison, though general, is extremely various. Many children, in apparently good health, have been repeatedly vaccinated without taking the disease, while in others, again, the vesicle has run its course for a few days, and then dried up. These constitutional peculiarities are exceptions to the general rule of mankind, being universally liable to the cow-pox. Some, also, resist this infection at one period of their lives, and are susceptible of it at another; and there are examples of the very opposite condition, or where the individual will receive the infection as often as it is presented to him. These peculiarities are occasionally witnessed with regard to the

\* This experiment, though often successful, is always uncertain; M. Friard vaccinated eighty-two cows without producing the cow-pox.—(Bousquet, p. 250.)

† When the disease was discovered in the Bergerie Royale de Rambouillet, Gerard inoculated a cow, three turkies and ten sheep, with matter taken from a child, the fourth transmission. This inoculation produced only an irregular brownish pustule on the teat of the cow, but failed altogether in the turkies. It produced small pustules in the sheep, but the matter taken from the sheep produced good large pustules, in others of the same flock, so that one hundred, to one hundred and fifty sheep were vaccinated with success. This experiment was made in the hope of preserving the sheep from *la clavelée*, a disease analogous to the small-pox.

poison of the small-pox, and are not explicable upon any known conditions of health or disease.

Many disturbing causes, also, have been observed to oppose the progress of the vaccine vesicle, and more especially diseased states of the skin. At a very early period, Dr. Jenner discovered that the affection was very much modified by the scaly tetter, and by those affections termed Psoriasis, as well as by those vesicular eruptions termed Herpetic, producing “every gradation from that slight deviation which is quite immaterial, up to that point which affords no security at all.”

It has been observed, though all ages are susceptible of the cow-pox, that the adult is less so than the infant, and requires to be vaccinated, perhaps, two or three times; while the latter readily, almost constantly, takes it on the first insertion of the virus. Although vaccination succeeds at all ages, yet, as the operation is for the prevention of small-pox, it is important to determine the best age to submit the patient to the disease. In the epidemy at Marseilles, 1828, no case of small-pox occurred in any child under three months old. M. Mathieu, also, has shown,\* in his tables, that small-pox is infinitely rare from birth to six months; but is extremely common from the age of six months, to one, two, three, four, and five years—and this calculation is further established by the table of deaths from the small-pox, published in the appendix to the first Annual Report of the Registrar General.†

## YEARS.

Age.	0—4	5—9	10—14	15—19	20—29	30—39	40—49	50—59	All ages.
Deaths from small-pox	889	99	15	18	29	5	2	1	1.050

It is plain from this table, that the danger from infection of

\* Annuaire des longitudes.

† P. 73.



small-pox is greatest in infancy, and commences as soon as the child leaves the nursery, and is allowed to be noticed by strangers. This period should, therefore, be anticipated, and the age from three to six months, as that in which the eruptive diseases of early childhood have ceased, and the irritation of teething has not commenced, is to be preferred for vaccination. There are instances of natural small-pox attacking persons of sixty, seventy, and even eighty years of age; and as that disease is in general fatal in proportion to the age, “senibus peior,” no previous exemption, should make us neglect this sure and simple means of guaranteeing ourselves from so formidable a scourge.

As a general principle, vaccination succeeds equally well at all seasons in this country; but in tropical climates the lymph, unless taken immediately from the arm, dries up, and often fails, in the heats of summer. In all countries, however, the spring is the season when small-pox is most epidemic—the spring, consequently, is the most important season for vaccination.

*Contagious.*—The contagious nature of the vaccine poison, is the basis of its use in medicine, and it is intimately combined with the secretions of the vesicle in every stage; for the disease may be equally produced by the lymph, the pus, or the crust. It is most energetic, however, in the early stage, or when combined with the lymph, less so in the pus, and most feeble of all in the crust; so much so, that Bousquet has found that the latter formed on a pustule any way broken or interfered with, is entirely inert and useless.\* The perfect crust, however, has been found most useful in hot countries,

\* Mr. Ceely is of opinion, that the effect of primary lymph from the cow is extremely slow and unsure on the human subject, and that secondary or tertiary crusts from the animal, are of no use whatever in communicating the disease. “And,” he adds, (p. 59,) “more than half my attempts to vaccinate with primary lymph taken from vesicles at a proper stage, and possessing all the characteristics of perfection, have entirely failed. The same individuals have immediately afterwards been successfully vaccinated with dry or liquid lymph which had been long current in man.”

and many practitioners have employed it with great success in India and in South America. The rule is, that the smaller the vesicle, the slower its development, and the less fluid it contains—and the earlier the stage, the more sure the infection. In general, however, the eighth day is preferred, as occasioning less injury to the vesicle.

When a number of children are to be vaccinated from one or two pustules, says Bousquet, it has been observed, that those operated on first, have more chances in their favour of taking the disease, than the last, which shows there is a moment when the pustule is exhausted, and, if further irritated, yields but a powerless fluid, or, perhaps, only a simple serosity.

Bousquet also affirms, that when we intend to preserve the crust, we should not wait till it falls off, but detach it early. At the moment, also, of employing the crust, the centre should be removed, it being supposed to be formed of dry inert, purulent matter. The rest is to be pulverised and mixed with a few drops of water, so as to form a paste. It has been recommended to gild the crust in order to preserve it;\* and Dr. Rigal de Gaillac states that crusts detached and covered with a slight coat of varnish, communicated the disease, in 1824, to children; the mode of infection being slight scarifications.

It has been attempted to determine the properties of the vaccine virus by chemical analysis, but nothing has been discovered but water and albumen, and some rudimentary crystals, common to all serous fluids. The specific agent has escaped detection, and like all other morbid poisons, appears to have no test of its existence than its action on the human body. It has been proved, however, to be of an extremely delicate nature, and its virtue to be greatly impaired by extremes of temperature. The experiments by Dr. Henry, have shewn that lymph heated to 120° F., is either volatilized or decomposed, for it then loses the power of communicating the infection. On the contrary, Dr. Mayon has proved, that lymph once frozen, however carefully liquified,

\* Bousquet, p. 101.



is equally rendered an inert fluid. It is owing to this cause, that so much difficulty attended the introduction of vaccination into Africa and the East Indies. As its introduction into the East Indies was of the utmost importance, matter was conveyed in the usual manner, but so completely failed, that Dr. Jenner proposed to government that some thirty or forty persons should be induced, for a pecuniary reward, to embark for that country, with a view to secure such a continued series of vaccination, that matter might be taken from the arm on the ship's arrival. This proposition, so benevolent, and so inexpensive, was, strange to say, refused. Dr. Jenner, therefore, proposed to effect it by a private subscription, and put down his own name for a thousand guineas. The exertions of Lord Elgin, however, rendered this sacrifice unnecessary ; for, after many fruitless attempts, his Lordship succeeded in forwarding matter from Constantinople to Bussorah, between glasses enclosed in a ball of wax ; and a source of vaccination being thus established at the head of the Persian gulf, vaccination soon found its way to Bombay.

*Fomites.*—The fact of inoculation, and the transmission of the virus to the East Indies in the manner that has just been mentioned, are ample proofs of this law. When the practice of vaccination was first introduced, Dr. Jenner often forwarded threads steeped in the virus ; then it was collected in tubes,\* hermetically sealed ; then ivory, platina and silver points were introduced, but of late years, it has been thought most efficacious when preserved between two plates of glass, half an inch square, and tightly bound together by thread.

*Susceptibility exhausted.*—As a general law, the vaccine disease affects the individual but once during life ; the poison protecting the constitution not only against itself, but also against the action of the small-pox poison, and recipro-

\* M. Bousquet says, M. Burdin and myself have vaccinated together, an equal number of children from arm to arm, and with vaccine matter preserved in tubes. The former gave twice the number of pustules over the latter, although the matter was only one month old. It seems, then, he adds, that the vaccine matter rapidly loses its properties by being kept in tubes.

cally, the small-pox poison protects the constitution, not only against any future attack of variolæ, but also against the cow-pox poison. It is upon the presumption that this rule is true, that the cow-pox poison has been introduced into medicine as a preservative remedy against the small-pox. On its first introduction, the law was supposed to be universal, but each year's experience has shown numbers of persons susceptible, either of a modified, or other more severe form of small-pox after vaccination. The consideration, therefore, of the proportionate number of exceptions to the alleged law, embraces the most important question connected with the practice of vaccination, or its completeness or incompleteness as a preservative remedy against the small-pox; and, consequently, the actual value of this great discovery. It will be better, first to state Dr. Jenner's expectations on this subject; how far they have been fulfilled, and, lastly, what is the amount of good which has actually resulted from the practice of vaccination.

Dr. Jenner ever entertained the opinion that the vaccine, and small-pox virus were essentially the same, the latter being purified, and its infectious and multitudinous nature destroyed in passing through the cow. He inferred, therefore, that the same laws which govern the one must govern the other; and, as the small-pox had sometimes failed in protecting the human frame against the future attacks of that poison, so it was probable, that in a given number of cases, the small-pox would occur after vaccination. It is plain, therefore, that he never contemplated vaccination as an *infallible remedy* against the small-pox, but expected that exceptions would arise to the general rule, in like manner as after inoculation. This opinion is, indeed, strongly expressed in a letter written to Miss Calcraft, immediately after the case of the Hon. Robert Grosvenor, who was seized, in May 1811, with a severe attack of small-pox after vaccination, and was with difficulty recovered. "There is that short-sightedness among them, I will not use a harsher term, which makes them identify a single failure with the general failure of the vaccine system; what if fifty or a hundred such cases should



“occur? They will be balanced a hundred times over by those  
 “of a similar kind after small-pox. This is what I want to  
 “impress on the public mind; but there will be great difficulty  
 “in bringing this about, because the multitude decide without  
 “thinking.” Again, in a letter to Dr. Baron, 11th June, 1811,\*  
 he says, “I am determined to lock up my brains, and think  
 “no more *pro bono publico*. I advise you, my friend, to do the  
 “same, for we are sure to get nothing but abuse for it. It is  
 “my intention to collect all the cases I can of small-pox, after  
 “supposed security from that disease. This would not be  
 “necessary on account of the present case, but it will prove  
 “the best shield to protect us from the past, and for *those*  
 “*which are to come*.” To another correspondent, about the  
 same time, he observes: “The failures of small-pox inoculation  
 “far exceed those of the vaccine, in those districts, where I  
 “have vaccinated on a large scale. That is proportioned to  
 “the number, as the latter exceed the former, ten to one—  
 “and of what import are the few that have occurred, as they  
 “have not produced fatal consequences?” His parting state-  
 ment on this subject, says Dr. Baron, must have been  
 written a very few days before he expired; I found it on the back  
 of a letter, the post-mark of which gives the date, Jan. 14,  
 1823, and he appears to have died on the 25th or 26th—  
 “My opinion of vaccination is precisely as it was when I first  
 “promulgated the discovery. It is not in the least strengthened  
 “by any event that has happened, for it could gain no strength.  
 “It is not weakened, for if the failures you speak of had not  
 “happened, the truth of my assertions respecting those coin-  
 “cidences which occasioned them, would not have been made  
 “out.”† The views of Jenner, therefore, were, that vaccina-  
 tion would afford a protection equal to, perhaps greater than,  
 the small-pox, and no more. Now how has this opinion been  
 verified?

We possess no sufficient data to enable us to determine  
 with precision the proportionate number of cases of secondary  
 small-pox, after the natural or inoculated small-pox. Many

\* Vol. ii, p. 161.

† Vol. ii, p. 311.

eminent physicians have never seen such an occurrence. The best authenticated facts, are the numbers attacked in the epidemic in Marseilles, and also in Chelsea Hospital. In the epidemic at Marseilles, it appears that out of two thousand persons who had had the natural small-pox, about twenty were affected a second time, or one in a hundred;\* or that ratio of exceptions, after vaccination, on which Dr. Jenner was contented to rest, the utility of this practice being demonstrated.

The number of secondary cases of small-pox after vaccination, are, however, unhappily greatly beyond this proportion. Dr. Thomson† states, that out of five hundred and fifty-six persons seized with small-pox, when that disease was epidemic in Scotland in the year 1818, no less than three hundred and ten had the small-pox after vaccination. It is to be regretted that Dr. Thomson has not given the ratio of the attacks to the whole population, but it is quite evident his calculations point to a much larger proportion of cases of small-pox after vaccination than one in a hundred. When the small-pox was epidemic at Norwich in 1819, a town which contained sixty thousand inhabitants, Mr. Cross states, that out of ten thousand persons who had been vaccinated, every twentieth person took the disease. Dr. Morton also states, that out of four hundred and one children vac-

\* From the return obtained from the Royal Military Asylum at Chelsea, embracing a period from 1803 to 1833, the number of children reputed to have had the small-pox previous to admission, was 2532; of which number 1887 were boys, and 645 girls. The number who had small-pox after reputed small-pox, was twenty-six or one in ninety-seven; of the twenty-six, fifteen were boys and eleven girls.

The number of boys reputed to have been vaccinated previous to admission, was 2498, of girls 562. The number who had small-pox after reputed vaccination, was twenty-four, or nineteen boys and five girls.

The number vaccinated at the Asylum subsequent to admission, was 628, or 460 boys and 168 girls. Of this whole number, only two boys and one girl caught the small-pox.

An anonymous writer in the Medical Gazette, Sept. 29, 1839, says, "I have examined the returns of several thousand cases which have occurred at Ceylon, the London Small-pox Hospital, the Royal Military Asylum, &c., and find that five and a half in a thousand have had the small-pox a second time."

† On Varioloid Disease, p. 19.



culated, one in twenty-five took the disease.\* In the epidemic at Marseilles, 1828, Bousquet calculates that there were thirty thousand persons in the city who had been vaccinated, and that out of those, two thousand persons took the small-pox, or one in fifteen.

As a deduction then from these imperfect data, it may be concluded that one person in twenty is liable to an attack of small-pox after vaccination; we possess, also, some data proving the ages most liable to this attack are immediately after puberty or from ten years to thirty. They are as follows:

CASES OF SECONDARY SMALL-POX AFTER VACCINATION.

Age	London. GREGORY.	Wurtemberg. HEIM.	Copenhagen. MÖHL.
Under 10 years	12	94	82
10 to 20 „	242	401	336
20 to 30 „	286	502	209
Above 30 „	22	22	6

It results, therefore, that in one case in twenty, after vaccination, the protecting agent continues to guard the constitution, as a general principle, only through the period of childhood, or for ten or more years—when the party again acquires a susceptibility to an attack of small-pox in a modified or in a virulent degree. The proportion of those forms occurring in one hundred cases as follows; and it will be seen that the whole mortality from small-pox after vaccination, is only seven per cent, while the rate of mortality among the unprotected in London, has amounted to no less than thirty-six per cent.

PROPORTIONS OF CASES OF SEVERE OR MODIFIED SMALL-POX AFTER VACCINATION.†

	Normal Small-pox.			Abnormal Small-pox.			Total Cases of Small-pox.		
	Numbers admitted.	Deaths	Rate of Mortality per cent	Numbers admitted	Deaths	Rate of Mortality per cent	Numbers admitted	Deaths	Rate of Mortality per cent
Kingdom of Wurtemberg, from July 1831 to June 1836.	186	64	34	869	11	1½	1055	75	7
Small-pox Hospital, London, from January 1835 to December 31st. 1839.	270	46	17	478	7	1½	748	53	7

\* London Medical Journal, 1827, p. 408.

† Dr. Gregory on Statistics of Small-pox, Medical Gazette, 1840, p. 544.

It has been thought the preceding data are only an approximation to the truth, and that the proportion of liability to small-pox after vaccination is much greater than one in twenty. The grounds for this apprehension, are data afforded by large bodies of persons re-vaccinated after different intervals of time, whence it appears, that one half to one third have taken this new infection. According to the report of the French Institution of 44,000 persons successfully vaccinated, 20,000 persons on being re-vaccinated again took the cow-pox. In this country, also, many similar instances have occurred. Dr. Babington, for example,\* states that four cases of small-pox having appeared among the children of the Deaf and Dumb School in February 1828, that he re-vaccinated the whole establishment, consisting of two hundred and thirty individuals. The results were one hundred and sixty vaccinated without effect, while the remaining sixty-eight had vesicles more or less perfect, many of which subsided after the eighth day. Again, in April, 1833, after an interval of more than five years, in the course of which the establishment, with the exception of the teachers, had entirely changed its inmates; two well marked cases of small-pox appeared, and two hundred and thirteen individuals were re-vaccinated—of these, in eighty-six cases there was no effect. In forty-one, all appearance of re-vaccination had disappeared on the eighth day—in twelve, the pock reached the eighth day, but vanished on the eleventh, while in the remaining seventy-four, the disease ran its course more or less perfectly, many of the vesicles being noted as spurious. At the London Foundling Hospital, also, of two hundred and sixteen cases re-vaccinated by Mr. Hutchinson, in eighty-three cases no effect was produced—one hundred and twenty two were spurious, and only eleven were successful. Germany, however, affords the largest amount of data, and the following are the results of the re-vaccination of the Prussian army, and also of a large number of re-vaccinations in the kingdom of Wurtemberg:

\* Guy's Hospital Reports.



## RESULT OF THE RE-VACCINATION IN THE PRUSSIAN ARMY.

Years	Total number	Successful	
1833	48,478	15,269	31 per cent
1834	44,454	16,679	37 „
1835	39,192	15,315	39 „
1836	42,124	18,000	43 „
1837	47,258	21,308	45 „

The particulars of the re-vaccination, in the year 1837, are given more in detail, as the pustule was,

Regular in	21.308
Modified in	10.557
No effect in	15.393

The following table is also the result, per cent, of more than 44,000 re-vaccinations in the kingdom of Wurtemberg:

	Good	Modified	No effect
Circle of Neckar . . . . .	57	23	20
* Circle of the Black Forest . . . . .	29	26	45
Circle of Jagot . . . . .	70	5	25
* Circle of the Danube . . . . .	27	35	38
Throughout the departments . . . . .	51	18	31
Military . . . . .	34	25	41
Average	46	20	34
Those marked with small-pox	32	26	42

It is certain, therefore, the constitution of a vaccinated person does, in a given number of cases, acquire a fresh susceptibility to the vaccine virus, and sometimes so rapidly, according to Roesch, that modified vesicles may be obtained at a very short period after vaccination. Here, then, a new question arises—does a liability to a second action of the vaccine virus imply a direct liability to small-pox infection?—for, if this be true, it would follow that one half of the vaccinated become, at some period of life, liable either to a virulent or to a modified small-pox. But the greatest doubts must exist as to the correctness of this deduction, for according to the Wurtemberg tables, out of a given number of variolated persons vaccinated by Heim, many of them covered with small-pox cicatrices, more than one fourth had complete vaccine vesicles, and nearly as many modified vesicles. But it has been shown, this class of persons is

\* Mostly children.

not liable to secondary small-pox in a greater ratio than one in a hundred. It seems, therefore, proved that a liability to a second action of the vaccine virus,\* does not necessarily imply a liability to the small-pox, and, consequently, the calculation that small-pox occurs after vaccination only in the ratio of one to twenty, is not greatly shaken. This proportion of failures, however, is much greater than was anticipated by Jenner, and two different sources have been pointed out as its cause, a degenerescence of lymph, and also imperfect vaccination.

The degenerescence of the vaccine virus has been contended for, on the ground that we are still using the virus introduced by Jenner, so that, supposing the matter from the original pustule to have been propagated by re-vaccination every eighth day for a period of forty years, it must have passed through the systems of 1800 different persons; and, consequently, that its properties may have become exhausted. This argument, however, is not supported by any fair analogy, for the poisons of other contagious diseases, as small-pox, syphilis, tinea capitis, or psora, have passed through an equal, or even a much larger series of persons, without, as far as we can judge, losing any of their properties, and without being, in any degree, mitigated in their effects, beyond what may be accounted for by the changes which have taken place in the habits and manners of society, and the modes of treatment. We are quite certain, also, that the virus used in the present day, produces a pustule as perfect, and which runs a course as regular as at the time of the first vaccination. The history of vaccination also shows that failures began to complicate this subject long before any degenerescence was suspected.

\* Although the casual cow-pox in man is mostly found on those who have not previously gone through variola, or the vaccine; "yet," says Mr. Ceely, "it is by no means rare to meet with it on persons who have passed through the latter, and a few who have had the former disease." (p. 48.) It is no novelty to see individuals who have taken the casual disease more than once at various intervals, but not severely; and now we often see cases after vaccination, at periods of from two to fifteen years, of different degrees of severity. On the other hand, we now and



The year 1804, in Jenner's estimation, formed an era in the history of variolæ vaccinae, for so many cases of failure had then occurred, that it was asserted the cow-pox afforded only a temporary security against the small-pox; and again in 1811, they had so multiplied, that a special report was published on the causes of failure, by the National Vaccine Establishment.

The cause of failure was sought for by Jenner, not in the degenerescence of the poison, but in the ignorance of the vaccinator and imperfection of the vesicle. He distinctly announced that it was possible to propagate an affection by inoculation, conveying different degrees of security, according as that affection approached to, or receded from, the full and perfect standard. He also stated, that the course of the vaccine pustule might be so modified as to deprive it of all efficacy, that inoculation from such a source might communicate an inefficient protection, and lastly, that all who were vaccinated were more or less liable to subsequent small-pox. He, therefore, recommended, that one pustule, at least, should remain undisturbed. "I recommended invariably," he says, "two pustules, and that one should remain unmolested."\* But if imperfect pustulation was the cause, the number of failures should decrease every day, for the character and amount of professional acquirements of the practitioners in medicine, have immensely increased since the introduction of vaccination. It is, however, extremely doubtful whether the perfection of the vesicle is essential to the success of the disease. "I have opened with a twofold design," says Bousquet,† "the pustules on their first formation. After having opened them, I have cauterised them deeply with *la pierre infernale*, so as to cut short, at once, all local action. That done, I have re-vaccinated these same children, in whom we might believe the vaccination not to have taken, but, notwithstanding, the second operation has "then meet with persons who, without any protection, have used every "endeavour to acquire the disease by milking, but have failed amidst their "more fortunate fellow labourers."

\* Baron's Life of Jenner, vol. ii, p. 21.

† P. 302.

always failed. To hold," he adds, "that vaccination is inefficient, unless the pustule runs through all its stages, is to say, in other words, if we empty out all the pustules in small-pox, the patient would not have had the small-pox—which is absurd."

The supposed causes of failure have not been proved, and it must, therefore, be apprehended that they depend on some inherent power of the constitution to acquire a new susceptibility to the action of the virus, for which we possess no remedy, neither can we predict the given case in which this event will occur.

Brilliant, then, as were the results of vaccination on its first introduction, and flattering as were the hopes entertained that the small-pox would ultimately be extinguished by the practice, still it must be admitted, that the exceptions have been so numerous, and have so greatly exceeded the expectations of Jenner, as to have brought into hazard the principle. Examples of small-pox after vaccination, have, unhappily, multiplied to an amount greatly beyond the cases of small-pox after inoculation; persons vaccinated by Jenner himself, have been attacked, and the disease has prevailed epidemically in many different towns of England, Scotland, France and Germany. We are, therefore, called upon to choose between a continuance of the practice of vaccination, with all these odds against it, and a return to that of inoculation. It is gratifying, however, to be able to state, that experience, as well as the whole history of vaccination has shown, that an immensely greater amount of good has been effected by the introduction of the cow-pox, than was produced by the practice of inoculation for the small-pox. A short comparison will unhesitatingly establish in the minds of the most sceptical, how infinitely more manageable a simply contagious disease is than one both infectious and contagious; and consequently, how desirable it is that the practice of vaccination should be persevered in, as a means of obtaining a present greater advantage, and also as affording a prospect of ultimately exterminating the most fatal and pestilent contagion that has ever afflicted mankind.



At the time vaccination was introduced, the practice of inoculation was in its highest vogue, and producing its greatest good. The sum of deaths, however, from small-pox at this period, was calculated by Dr. Lettsom to be 210,000 annually, for Europe; and by Bernouilli to be 600,000 annually, for all quarters of the globe. It was ascertained besides, that the small-pox had been imported into the Channel fleet no less than a hundred times in seven years; and that in the year 1800, it had broken out twenty times in that fleet alone. It was found, also, that inoculation, so far from diminishing the mortality, had, by more widely spreading the infection, greatly increased it; so that the number of deaths from small-pox had increased in the ratio of seventy-two to ninety-five—a result, which has shown that while the practice of inoculation was salutary to individuals, it had been injurious to the community. The following is the reverse of this picture:

In this country, where legislative enactments have not as yet been employed to extend vaccination, we, nevertheless, observe a great diminution of mortality from the small-pox, since the introduction of that practice. The population of England and Wales, as estimated by Mr. Finlaison in the year 1800, was 9,187,176; and of this number, it was calculated that 40,000 died annually from small-pox. In 1838, the population is estimated at 15,324,720 persons; and, according to the Report of the Registrar General, in the half year commencing the 1st July, and terminating on the 31st December, 1837, there died 5,811 persons of small-pox, or 11,622 annually. The calculation, therefore, is, that in the year 1800, there died one person in 221 of small-pox; while in the year 1837, there died only one person in 1318; showing a diminution of mortality from this cause of 5-6ths in England and Wales.\*

The salutary power of vaccination in controlling the dread-

\* In the Dragoon guards, and Dragoons quartered throughout the kingdom, only one soldier has been attacked by small-pox in every two thousand annually; while, among the whole force of the white troops in Jamaica, only three cases occurred, and none proved fatal.

ful mortality of small-pox having been ascertained, different governments on the continent adopted different modes of promoting the practice—some by authoritative statutes, others by rewards and inducements of various kinds. Sweden and Denmark adopted the first method, as did also many of the German States, and the result has been as follows : Vaccination was introduced into Vienna, in 1798, at a time when the mortality from small-pox was as great in that city, in proportion to the population, as in London ; yet, as early as the year 1804, only two persons died in Vienna from small-pox, and those two were cases imported, the one from Suabia, and the other from a distant village ; and, as late as the year 1826, Dr. de Carro writes to Dr. Baron,\* “ Nothing is so rare among us as a case of small-pox after vaccination ; I do not believe six such cases could be ascertained in Vienna.” Before vaccination was introduced, or from 1788 to 1800, 5,500 persons died of small-pox in Copenhagen alone ; while, from 1802 to 1818, only 158 died in the whole Danish dominions ; and from 1809 to 1823, there was absolutely no case whatever of small-pox in Copenhagen. In the year 1797-8, about five hundred died annually of the small-pox in the Principality of Anspach ; but in 1809, only four died ; and from 1809 to 1819, none whatever. The same great diminution of the frequency of occurrence, and of the number of deaths, has been observed in Sweden and Prussia. In the latter, the total number of deaths throughout the whole Prussian dominions, from small-pox, was, previously to vaccination, 40,000 annually ; while in 1820-21, the mortality was 3137 ; which, in a population of twenty-three millions, gives only one death, for every 7204 persons. In Sweden, in 1800-1801, or before the introduction of vaccination, 18,189 fell annually victims to the small-pox, but from that time, no epidemic of that kind visited this kingdom till 1824, when only 560 persons died. In France, also, before the introduction of vaccination, 150,000 perished annually from the small-pox ; while in 1811, only 8,500 died of that

\* Vol i, p. 266.



disease ; and in 1822, the deaths were still further reduced to 6538—and that too at a time when the vaccinated were to the births, only as five to nine. Such are the very highly satisfactory, and even splendid results of the practice of vaccination, as deduced from the great masses of facts. It will be seen, also, by a reference to individual cases, that the personal sufferings and imminent hazard of the party afflicted with small-pox after vaccination, have, in the great majority of instances, been diminished.

During the epidemic in Scotland, Dr. Thomson saw, from June 1818 to December 1819, 556 cases ; of these, 205 had neither small-pox nor cow-pox previously, and there died fifty, or nearly one in four ; forty-one had the small-pox for the second time ; and he was also informed of thirty other similar cases, making in all seventy-one ; and of these, three died, or one in twenty-three only ; while 310 had small-pox after vaccination, and of these, only one died. The population of Marseilles at the time of the epidemy at Marseilles in 1828, was estimated at 40,000, or of 30,000 vaccinated, 8,000 not vaccinated, and 2,000 variolated ; out of 30,000 vaccinated, about 2,000 were attacked, and out of this number twenty perished, or one in a hundred. Out of 8,000 not vaccinated, 4,000 were attacked, and out of this number 1,000 perished, or one in four ; while out of 2,000 variolated, twenty were attacked, and four perished, or one in five.\* This statement shows the actual decrease of danger. The following extract from Dr. Thomson will show the decrease of personal suffering.†

“ It has been impossible to see the general mildness of the  
“ varioloid epidemic in those who had undergone the process  
“ of vaccination, and the severity, malignity and fatality of the  
“ same disease in the unvaccinated, and not to be convinced of  
“ the great and salutary powers of cow-pox in modifying the  
“ small-pox in those who were afterwards affected with this  
“ disease. Proofs cannot be imagined more convincing and  
“ satisfactory of the efficacy of the practice of vaccination, and  
“ of the incalculable benefit bestowed upon mankind by its

\* Bousquet, p. 195.

† Thomson on Varioloid Epidemic, p. 40—108.

“discovery, than those I had the pleasure of witnessing.” The experience of Dr. Thomson is that of the profession generally, eight cases out of ten of small-pox, after vaccination, being singularly mild in their course, and terminating about the eighth day without secondary fever, and without maturation of the pustule. It seems proved, therefore, not only from the great masses of facts, but also from the individual cases, that the practice of vaccination has not only abated the mortality, but greatly diminished, in every way, the personal suffering from small-pox.

Another, and powerful reason for preferring vaccination to inoculation is, the facility with which the spread of the small-pox can at once be stopped. In 1828, when the small-pox broke out among the children of the deaf and dumb school, Dr. Babington, it has been stated, re-vaccinated the whole remaining establishment, of 230 individuals, and not a case of small-pox, or of varioloid disease appeared afterwards. Again, in 1833, when the school had entirely changed its inmates, the small-pox made its appearance in two well marked cases, the same physician re-vaccinated the whole of the remaining establishment of 213 persons, and only one case occurred after this measure. These experiments of re-vaccination have been repeated, under similar circumstances, at the *Institut Royal des Sourds-Muet* at Paris\* in 1839, and on a greater or less scale, many times over, and always with success. It is proved, therefore, that on the breaking out of any future epidemic of the small-pox, that the unprotected, of which there are always a large number in every great town, may ensure themselves a present immunity by submitting to be vaccinated, a process by which no infectious disease is generated, and which hardly requires a cessation from the ordinary pursuits of life, or at most only for a few hours; on the contrary, supposing a similar exemption may be gained by submitting to inoculation, an infectious disease is generated, contaminating all around, while the patient himself is incapacitated for a fortnight.

It having been shown how greatly the mortality from small-

\* *Bulletin de l'Académie Royale de Médecine*, July 31, 1840.



pox has been diminished by vaccination, it seems almost a necessary consequence, to enquire what have been its effects on the duration of human life, and on the amount of the population of England and Wales, which has increased from 9,164,667 in 1801, to 14,111,768 in 1831, and to 15,000,000, and upwards in 1838.

The question of the increase of the population is a very difficult problem. If the only thing necessary to an augmentation of the population were the production of children, the surface of our globe would be soon covered with inhabitants. Franklin only asked 200 years for this purpose; and Sismondi has calculated that, placing the first Montmorency, in the year 1000 of our era, and supposing that his family and their descendants to have multiplied in the same proportion, their progeny would now amount to more than 2,147,475,648 persons, or to four times the present existing number of the human race. The power of mere propagation is immensely greater than that of subsistence; so that, unless kept down by physical wants and moral influence, the amount of population would be infinite. There is but one great cause, consequently, which can permanently increase population, namely, industry, and its product, wealth; where those prevail, epidemics, the most destructive, even the most obstinate, hardly affect it; for should they rage in one year, the marriages are more numerous and more fruitful the next, and the equilibrium, for a moment broken, is almost as immediately restored. When the plague ravaged Prussia, in 1710, the births in the preceding year were found to be 26,000; but in 1711 they amounted to 32,000; so great is the tendency of a population to rise up to the level of the resources of a country. The population of France did not cease to increase amid the saturnalia of the Convention, and the bloody wars of the empire. Men abound where science, arts, and civilization have established their empire, and decline when they retrace their steps. It will be seen, then, that the removal of the scourge of small-pox, and the infirmities it brought with it, is but one element in the problem of the increase of the population; for the child, though once preserved, must ultimately fall, unless provided with aliment

suited to its age, shelter and clothing to the climate, and education to enable it to provide for itself. It is grateful, however, to be able to affirm, that the baptisms, which in the year 1802, or the year after vaccination was generally introduced, amounted only to 273,837 — in the year 1807, amounted to 300,294; and according to the returns for 1838, they reached to 399,712. So constant and considerable an increase in numbers, is, perhaps, the strongest proof that can be produced of vaccination having had some effect in increasing the amount of the population.

It has been thought that not only has the population been augmented, but the mean and probable duration of life have been increased since the introduction of vaccination,\* and if the many statistical tables could be relied on, such must be the case. But taking the tables drawn from the deaths of the higher classes of society, this is questionable. M. de Parcieux's tables, founded on the mortality in the French territories, prior to 1745, show that out of 100,000 persons, aged twenty-five, there would be alive at the age of sixty-five, 51,033. Mr. Griffiths' tables, founded on the experience of the Equitable Life Insurance Office, is 49,330—a calculation which embraces only a small number of women, who are considered better lives than men—again, if we take Mr. Finlaison's calculation, founded on the experience of the Government Life Annuities, we find the number amount from 53,470 to 53,950, or nearly the same proportion as attained that age a century ago. It seems, then, that the probable life of the higher classes is hardly increased, and, consequently, the increased mean duration of the lives of the population generally must be referred, perhaps, to the improved habits,

\* At Geneva, it is calculated from their tables, that from 1750 to 1800, the mean duration of life was equal to thirty-four years, six months and eleven days; from 1801 to 1813, thirty-eight years, six months, 0 days; and from 1814 to 1833, forty-five years, 0 months, and twenty-nine days. The probable life, in like manner, was from 1750 to 1800, thirty-one years, 0 months, thirty-five days; 1801 to 1813, forty years eight months, 0 days; and from 1814 to 1833, forty-five years, 0 months, twenty-nine days.



manners, and wealth of the community, rather than to the effects of the peculiar cause in question.

The gratitude of the public, then, is claimed, not for an increase of the population, in consequence of the introduction of the cow-pox, but for a large diminution of deaths in early childhood, and for a probable increased mean duration of life. The effect of the former has been to save all the expense, incurred by the nursing, clothing, and early education of the child that was, formerly, early destined to fall; and the death of a child is a total loss to society of all that has been expended on it. The effect of the latter, as calculated from the experience of Geneva, has been a diminution of the infant population, and later marriages, and as a consequence an increase of the adult population, or of persons enabled to support themselves, and to increase their country's wealth by individual industry and talent. It is considered, also, although the marriages are later, and less productive, that the children are better fed and clothed, their physical and moral powers more fully developed, the duration of their lives prolonged, and the general happiness increased. It is necessary, however, to return to the consideration of the general laws of this disease.

*Co-exists.*—The vaccine virus is capable of co-existing with many other poisons, as with that of syphilis,\* of scarlatina, of measles, or of the hooping cough; and, according to the usual laws of morbid poisons, it sometimes modifies, at others, suspends them, and is reciprocally acted upon by them. Dr. Jenner has recorded the case of a child, in whom scarlatina with sore throat appeared on the ninth day of vaccination, causing a total suppression of the areola around the vesicle until the scarlatina had subsided. A sister of this

\* Vaccine virus has been taken accidentally, or by design, from children labouring under syphilis, and the vaccine disease has been produced in all its purity, and without communicating the original infection. Vaccine virus has, also, been taken from children labouring under the itch—but the itch has never been communicated by the operation. It seems, says Bousquet, (p. 86,) of little moment, therefore, from what class of patients scrofulous, rickety, or other state of ill-health we take vaccine virus. The poison produces its own disease, but no other.

patient, also, in whom the areola had already formed, was likewise seized, but the scarlet efflorescence was slight, and suddenly disappeared. Four days after, or on the decline of of the cow-pox, scarlatina anginosa formed, and ran its course with the usual symptoms.\* Mr. Fairish also states,† he vaccinated two children in whom no infection took place for twenty days, when it was discovered they had the itch. This complaint was removed in a few days by the usual means, when the arm of the eldest began to inflame, and the cow-pox appeared. Dr. Winterbottom‡ describes the retardation of vaccination by the supervention of measles, as an event too common to excite particular attention. Vaccination is also popularly believed to be a means of curing the whooping cough; Dr. Adams states he has often witnessed this effect, but adds§ it should not be performed till the acute symptoms be passed, otherwise we must expect its return when the progress of vaccination is completed.

Of all the complications of the cow-pox with other morbid poisons, that with the small-pox is fraught with the greatest interest. As a general law, it may be asserted, that after the vaccine poison *has run its course*, the constitution is protected against the action of the variolous poison; and, in like manner, the variolous poison having run its course, the constitution is protected against the action of the vaccine virus.

If the poison of the cow-pox and of the small-pox be separately inserted in different places, in the same person, at the *same time*, or within a week|| of each other, each pursues its course as if inserted in two different subjects, and the lymph from the vaccine vesicle produces the vaccine disease, while that from the variolous vesicle produces the small-pox.

When a person has been inoculated with a mixture of the variolous and vaccine poisons, Adams states,¶ only one will

\* Further observations, p. 138—170.

† Willan on inoculation, p. 10.

‡ Med. Trans., vol. xiv, p. 25.

§ Morbid Poisons, p. 13.

|| Willan.

¶ P. 16.



take effect. This effect, however, is not uniform, for Bousquet\* inoculated three children with a mixture of the two poisons, of whom, two had the cow-pox only, but in the third, the cow-pox proceeded, as usual, till about the eighth day of that disease, when a slight eruption of the small-pox appeared.

If the two poisons be inserted about the same time, and near to each other, one common areola will surround both punctures, but the vesicles will be distinct, each preserving its own character,† and secreting its own peculiar virus. If the patient be exposed to a variolated atmosphere at the time he is vaccinated, both diseases will probably result—a law distinctly proved by many instances, when vaccination was first attempted at the Small-Pox Hospital. If vaccine lymph be inserted about four days after exposure to the infection of a variolated atmosphere, the two diseases may co-exist, or the one may precede the other. Patients, says Dr. Willan, admitted into the Inoculation Hospital, have often pustules on the body after the vaccine matter has been inserted in the arm, from the following cause; they are mostly persons from the country, who, alarmed at finding some of the houses where they lodge or visit affected with the small-pox, endeavour to anticipate the disorder by means of vaccination, but the application is, probably, too late. An example of this kind occurred a short time ago in St. Thomas's Hospital—a child that had been exposed to variolous infection for four or five days, was vaccinated, but the vesicle did not rise. A modified small-pox, or *variolaë verrucosa* appeared, and ran its usually mild course; this disease terminated, the vaccine puncture began to inflame, a pustule formed which, though small, ran its course, and had all the usual characters.

“When the small-pox and vaccine diseases have been

\* *Traité de la Vaccine*, p. 328.

† Leroux has seen a vaccine crust implanted in the centre of a variolous crust. He inoculated with it, and the vaccine portion produced its disease with all its advantages, and the small-pox portion, the small-pox with all its dangers (Bousquet, p. 86.)

“inoculated about the same time, the eruptions were, in all “the cases I saw at the hospital,” says Willan, “of the “species, vulgarly called the horn-pock, being hard, semi- “transparent, and though of long duration, did not matu- “rate.” This statement is, as a general principle, correct ; but there are exceptions to it ; and Bousquet has given no less than sixteen cases\* in which the cow-pox and small-pox co-existed, and yet all the patients perished.

Variolous matter, inserted on the ninth day after vaccination, appears to have its actions wholly precluded.† But Bousquet, however, affirms that this protecting influence is imparted as early as the fifth day ; a principle to which, as has been stated, there are, unhappily, many exceptions.

*Mode of Absorption.* —No instance is known of the vaccine virus having been absorbed by a mucous membrane ; nobody, of course, choosing to apply it to that tissue. We are, therefore, only acquainted with its action on the cutaneous tissue to which it is applied by inserting it, by means of a lancet, under the epidermis of some portion of the upper arm.‡ It is usual to make three or more punctures for the purpose of ensuring a supply of lymph, but one puncture followed by a normal vesicle is sufficient to give the fullest protection to the constitution. The experiments of Staed, show that the poison thus placed in contact with an absorbing surface, is rapidly taken up, and the constitution instantaneously affected, for, in no instance has he been able to prevent the disease, although he has, immediately after the puncture, washed the part with water, or a solution of ammonia, or of the chloride of

\* P. 117.

† Willan, p. 4.

‡ “One of my medical acquaintances,” says Mr. Ceely (p. 49), “who “had been engaged all the morning in vaccinating, and had wiped the “lancet in his pocket-handkerchief, on his return home unconsciously “vaccinated his infant son on the right ala nasi by the application of the “handkerchief to this part. The child suffered severely, and bears now “a large deep scar in testimony of the event. In the casual cow-pox, “the backs of the hands, flexures of the joints, the forehead, eye-brows, “nose, lips, brow and ears are often implicated.”



soda. Bousquet\* has also attempted to prevent the formation of the disease by applying the cupping glass, instantly, over the punctured part; but although he has kept it on for ten, fifteen, twenty and even thirty minutes, till phlyctenæ have formed and blood flowed in abundance, so that he was apprehensive of gangrene, still in no instance has he been able to prevent or to retard the occurrence of the disease.

A breach of surface, however, is not always necessary to the success of vaccination, for I have often succeeded, says Mr. Ceely,† in procuring vaccine vesicles without punctures on the skins of children especially, and young persons by keeping lymph in contact with the skin, and excluding it from the air by a coating of blood; active lymph, blended with blood, trickling down the arm and drying in the most dependent part, will often give rise to a vesicle. Not many days since, he adds, I had a case where such a vesicle, at a distance of four inches from the inoculated vesicles attained, on the twelfth day, the size of a small horse-bean, and having no firm connection with the skin at its centre, like the casual vesicle on the cow, it acumined on the eleventh day as perfectly as on that animal.‡

*Period of Latency.*—The usual period of latency of this poison, is two, sometimes three days; but when the system is under the action of other poisons, their counteracting influence has been known to prolong the period of latency for three weeks.

*Pathology.*—The theory of the disease is, the vaccine virus being absorbed, probably mingles with the blood, with which it lies latent for a few hours, and this infects the constitution, after which it produces its specific action or a pustule at each point of insertion. The constitutional affection, though apparently trifling, is, however, the primary and essential condition, the development of the pustule being only an indication that result having been produced.

\* P. 49.

† P. 116.

‡ We are told by Dr. Jenner, that Mr. Tanner succeeded best in retro-vaccinating the cow in an old superficial wound from which he had removed the crust.

The vaccine pustule runs a given course of vari and of vesicle, which, at length, terminates in a concretion and forms a crust. The stage of vari, lasts but one day; the vesicular stage consists of four days *umbilicated* and three *acuminated*; the process of encrustation is also three days; and that of detaching the crust, takes three days more; so that allowing three days for incubation, the whole duration of the disease, from the time of puncture till the detaching of the crust, is from fourteen to seventeen days. A slight fever usually occurs about the eighth day, and lasts for three days. Occasionally, the whole course of the disease is accompanied by a slight fever.

The first day after vaccination, we observe nothing but the redness which is inseparable from every puncture. On the following day, it is impossible to determine whether the vaccination has taken. On the third day, however, sometimes a little earlier, sometimes a little later, the punctured part is seen to be inflamed, and the varus of the future pustule is formed, and sufficiently elevated to give a sensation of hardness. On the fourth day, the varus has considerably enlarged; and on the fifth, a vesicle has formed on its apex, and lymph, in some cases, may now be collected from it. This vesicle is depressed at the centre, or *umbilicated*. Usually about the eighth day from the time of vaccination, or on the fourth or fifth from the appearance of the varus, the vesicle has attained its greatest size, and is from two to three lines in diameter. It is still umbilicated, the cuticle white and opaque, but a brown spot has appeared at the centre, which shows that the cellular bride which ties it down, is about to rupture.

“Hitherto,” says Dr. Adams, “the appearance is very  
“similar to the small-pox, and, in some cases cannot be dis-  
“tinguished from it; but from this time, the difference be-  
“tween the two pustules is easily marked; for in the small-  
“pox, however regular the pock may have been up to the  
“eighth day, it now becomes jagged at the edges, and its  
“contents more or less purulent; while in the cow-pox, the  
“vesicle continues circular, and its contents limpid.”



On the eighth day, from the time of the puncture, a bright red areola encircles the base of the pustule; an appearance which has led Jenner figuratively, but happily, to remark, that it was now "the pearl upon the rose." Between the eighth and the eleventh day, the cellular bride ruptures, and the vesicle fills, or becomes *acuminated*. At this period, the red areola enlarges, and is of a deeper red, while a slight fever, termed the "fever of vaccination," comes on, and lasts from three to four days. About the eleventh day, the fever subsides, and between the eleventh and fourteenth days, the pustule ruptures, and secretes a fluid, which forms a crust. The inflammatory areola has already begun to abate, and generally before the seventeenth day, the crust falls off, leaving the usual large round cicatrix.

The *vaccine cicatrix* is round, deep, puckered, radiated and studded with points, which answer, without doubt, to the cells into which the interior of the pustule is divided. It is more marked in proportion as it is more recent, but is never entirely effaced by time.

The description which has been given of the pustule, is taken from the child, but the skin of the adult has neither the suppleness or delicacy of early life, and the pustule, consequently, is less flat, less umbilicated in the adult than in the infant. Neither has it the same regularity of form, nor the same pearly lustre, and the areola is less intense, and, in a word, all its characters are less marked. The adult, however, is even more sensible to the effects of the disease than the infant; for the pain in the axilla is greater, the engorgement of the glands of that part more common, and the fever more severe, and, take it altogether, the suffering greater.

Considered anatomically, the vaccine pustule has its seat in the muciform tissue of the cutis, and is a little more superficial than the small-pox pustule, which has its seat in the thickness of the dermis. At its origin, it is only a small tubercle, more or less hard, but when most perfectly organized, bisect, either horizontally or perpendicularly, a pustule, and it will be seen divided into a number of cells,

separated from each other by a thin cellular tissue, each filled with a clear diaphanous liquid, which is the vaccine virus. The cells do not communicate together, but radiate from the circumference to the centre, where they unite in a common bride, which depresses the cuticle, and gives the umbilicated character to the pustule. This is the state of parts from the sixth to the ninth day—but it does not last, the lymph becomes altered and turbid, and pus mingles with the virus,\* the bride is broken, and the pustule ruptures.

Among the variations in the course of the pustule, Bousquet† mentions, that he has several times seen (*plusieurs fois*) such differences in the development of the pustules, that some had run their course, while others were only commencing it. M. Frebault has witnessed a fact still more extraordinary, or a pustule which had completed its course, beginning *de novo*, and running through it a second time. A still more singular anomaly has also been witnessed, and more at variance with the usual laws of the vaccine virus, or a general cow-pox eruption. Bousquet gives a case‡ in which the supernumerary pustules were so many, that he doubts whether the distinct small-pox ever presented a larger number. A similar case also occurred in the re-vaccination of the Prussian army. A case of this kind also occurred in the child of a gun-smith in Oxford Street, and which, at length, died, exhausted by the disease.

There are many other anomalies, also, in the form and character of the pustule; for it may be so small as to render its character doubtful, or its course may be so short as to dry up on the sixth or eighth day. These deviations, perhaps, depend sometimes on the quality of the vaccine matter; more commonly, perhaps, on some peculiarity in the constitution of the recipient.

These varieties give rise to an important question, connected

\* “Le pus se mêle au vaccin,” says Bousquet, p. 58, who considers Jenner in an error in stating that the lymph continues limpid throughout the whole course of the pustule, p. 82.

† P. 60.

‡ P 61.



with the pathology of vaccination, or whether the disease is local and the pustule essential, or whether it is constitutional and the pustule only an accident. Bousquet is of opinion that the latter is the case ; and to prove his position, he has on the first appearance of the pustule, opened it, and deeply cauterized it with the *lapis infernalis*, so as to cut short the course of the pustule altogether ; he has afterwards re-vaccinated the child so treated, but in no instance succeeded in producing a pustule by this second operation. He, therefore, infers that the pustule\* is not indispensable to the disease, any more than the small-pox eruption is necessary to the small-pox ; the preservative effect, in both cases, on the constitution not being caused by the pustule, but made manifest by it as its visible sign.

The permanency of the vaccine influence when the incipient vesicles were destroyed by caustic, will, doubtless, says Mr. Ceely,† be questioned by many. That the integrity of the vesicle is not essential to the production of the constitutional and preservative influence has been assumed from the experiments of that gentleman (Bousquet) and analogous cases to this now related. I have certainly met with not less than ten such cases, in which, at various periods, from fourteen to eighteen years afterwards, I have been unsuccessful in re-vaccinating.

The doctrine of the perfect development of the cow-pox vesicle not being essential to the security of the constitution from the small-pox is undoubtedly true ; but still the local disease is the best measure we possess of the degree of the constitutional affection, and it might be presumed, the more perfect the vesicle, the more complete the protection. But many difficulties beset this subject, for we can hardly be said to possess a standard vesicle ; and some persons consider the size of the vesicle as necessary to its perfection, while others conceive the smaller vesicles to contain a more active and efficient lymph. In after life, also, the history of the case is frequently lost, and we are obliged to judge of what

\* P. 319.

† P. 129.

the vesicle has been, by the cicatrix—this point, also, is very much perplexed, for, according to Mr. Dodd, out of fifty-seven cases exposed to small-pox, and escaped, in six only was the cicatrix perfect; in twelve, slightly defective and in thirty, very imperfect.\*

In the same work, also,† it is stated, that out of one hundred and thirty-four cases of vaccinated persons who had been exposed to small-pox, the cicatrices of seven were perfect, and one of these failed; twenty-eight slightly defective, of which fourteen failed; seventy-seven very imperfect, of which forty-seven failed; twenty-two had no marks at all, and of those fifteen had the small-pox, while seven escaped altogether. In the Small-Pox Hospital, as many as five excellent cicatrices have been observed in some of the variolated cases.

The vesicle and its result, the cicatrix, are, consequently exceedingly fallible criterions of the actual amount of constitutional protection; and it has, therefore, been proposed to apply a variety of tests—Mr. Bryce has recommended the insertion of some fresh vaccine lymph a few days after the first vaccination. This practice is recommended, on the ground that a second vaccination proceeds, in an accelerated degree, provided the first has taken effect, and is a beautiful illustration of the constitutional effect of vaccination. By others, it is proposed, after some short interval, to re-vaccinate the patient; but it will be plain, the only sure test is the insertion of variolous lymph.

*Symptoms.*—It is seldom that any other symptoms than those that have been mentioned occur in the course of the disease, except some occasional eruption on the arm, as roseola, strophulus, or lichen, or some unimportant and trifling abscess or boil on the same part.

In some instances, says Mr. Ceely,‡ a vesicular eruption of a pemphigoid character, either in bullæ, or closely resembling lenticular variolæ, was observed both in a solitary and in a grouped form. This seems to me, he adds, to be

\* Report, p. 34.

† P. 35.

‡ P. 135.



strictly a vaccine eruption. It is seen on the cow, and often on young dogs, during, or after the secondary vaccine symptoms. It will subside in a few days, or continue for some weeks in children. This gentleman, also, observes that in casual cow-pox, “if the skin of the hands be very thin and “florid, especially if chaps and fissures abound, the individual often suffers severely, having soon after the decline of “the disease, abscesses and sinuses of the sub-cutaneous “cellular tissue, and often considerable inflammation of the “absorbents and the axillary glands.”\*

*Prognosis.*—Is always favourable.

*Diagnosis.*—The circumstance attending vaccination, render it impossible to confound this disease with any other; but, perhaps, it may be as well to contrast the phenomena of small-pox and of cow-pox together. Their points of similarity are, that their number of stages is the same, and also their length, and, consequently, the whole duration of the two diseases is the same. The external form of the pustule is also the same; so that, according to Jenner, compare them on the seventh, eighth, tenth, twelfth, or any other day of the disease, no sensible difference can be discovered. The internal structure of the pustule is also similar, and different from that of every other known eruption. They equally give rise to a fever about the ninth day, and which subsides nearly in an equal time, or from two to four days.

Their points of difference are, that the virus of the one is both contagious and infectious, while the other is simply contagious. Their periods of latency are different; the one being only three days, while the other is from seven to ten days, or from ten to sixteen days, according to the mode in which the poison is introduced. The virus of the one, generally acts on two membranes, and has many secondary actions, while the other affects only one membrane, and has no secondary actions. The eruption of the one is multitudinous; that of the other, limited to the point of insertion. The one, likewise, is ushered in with severe fever, while the

other is accompanied by no such phenomena. The pustule of the one, most usually matures, a circumstance exceedingly rare in the other. The secondary fever is slight in the one, while in the other, it occasions a large mortality. Lastly, the small-pox is frequently followed by a long train of disgusting and frightful sequelæ, while, on the contrary, no appreciable taint is left on the constitution by the practice of vaccination.

*Treatment.*—The treatment, at most, is a milk diet and attention to the bowels, and occasionally some slight local treatment when the arm is considerably inflamed.

In concluding this outline of the laws of this remarkable poison, it may be stated, as certain, that we have much to learn respecting the exact nature of the disease as it affects the cow. It is, likewise, by no means proved that the small-pox and the cow-pox are identical diseases, or even of the same species; also, that the expectation formed by Dr. Jenner, that the cases of small-pox, after vaccination, would not be more numerous than the cases of secondary small-pox, has not altogether been verified, the evidence, at present accumulated, showing the attacks of the latter to be only in the ratio of a half to one per cent, while the attacks of the former are not less than five per cent, or from five to ten times greater. It is enough of glory, however, to the discoverer of vaccination, and of honest pride to the profession who have adopted it, to be able to state, that by the discontinuance of the practice of inoculation, the total number of persons attacked by natural small-pox in this country, taking the most unfavourable calculations, is reduced one half, or, probably, from 260,000 annually, to about 130,000 annually; while the number of deaths have been reduced, in a still greater ratio, or from 60,000 to about 11,000; also that the accidents incident to the disease, as blindness, deafness, lameness, and the endless catalogue of miseries which follow it, are likewise reduced almost to nothing. This result is that of England and Wales generally, and it is still capable of being very greatly reduced, for among the better protected class



of persons, as the army, only one soldier has been attacked by small-pox in every 2,000 annually; so that, taking the British army at 100,000 men, the mortality is only four from small-pox, in the whole of that large force, annually. The navy appears, also, to experience a similar immunity, for out of a mean strength of 7958 seaman, seven only died in seven years of small-pox in the Mediterranean and Peninsular commands; while in the West Indian and North and South American commands, none whatever.\* On the continent, also, where the governments, awakened to the great truth, that the health and industry of the lower orders, forms the surest basis of national wealth and greatness; and where vaccination is, consequently, made of national importance and a matter of legislation, we find that the mortality from small-pox, though greater than in our army, is infinitely less than in England and Wales generally. In Prussia, for example, according to the table given by Hoffman, on an average of a million of deaths, only 8191 were caused by small-pox or one in 122. In England and Wales, however, out of 141,607 deaths, 5,811 were occasioned by small-pox, or one in twenty-five nearly; thus showing, that the country which gave birth to vaccination, suffers six times more by small-pox than that of its wiser and more considerate neighbour. It is plain that the time is come when government, from a sense of public duty, ought to supersede the uncertain and capricious results of private benevolence, by a liberal contribution for the advancement of vaccination; a system, which, if carried out, seems ultimately to ensure the entire extermination of the small-pox. The profession can never be compensated for the pecuniary loss sustained by their honest efforts to substitute a mild for a pestilential disease; but the successful exertions of any class can only be excited by reward, and it is surely bad policy to withhold all remuneration, or nearly so, for the performance of a duty contrary to the interests of the party performing it, and upon which,

\* Statistical Reports of the Health of the Navy, p. 226—228.

so much of the contentment, happiness, and prosperity of the community depends.\*

\* Since the above was written, a bill has passed, to extend the practice of vaccination, authorizing the guardians of every parish or union, or overseers, when no guardians, to contract with legally qualified medical practitioners, for the vaccination of all persons resident in such unions or parishes ; the amount of remuneration to depend, not on the number of persons successfully vaccinated, but on the number of persons, who, not having been previously successfully vaccinated, shall be successfully vaccinated ; a faulty enunciation, which, it is presumed, is not intended to render invalid the more obvious intention of the clause. Also, that any person who shall, after the passing of this act, inoculate with, or wilfully expose to, variolous matter, to produce the disease of small-pox in any person in England, Wales, or Ireland, may summarily be proceeded against, before two justices of the peace in Petty Sessions, and upon conviction, be imprisoned in the common gaol or house of correction, for any term not exceeding three months. It is to be regretted that this clause, which is calculated to produce much good, was not confined to unqualified persons ; for there are circumstances which might imperatively call upon a medical practitioner to inoculate, such as small-pox breaking out in a family not previously vaccinated or otherwise protected, and no vaccine lymph at hand, which is by no means uncommon in the remote villages of England and Wales, where the population is too small to keep up a continued series of vaccination.





## SYPHILIS

is a contagious disease, consisting of an ulcer termed the “primary symptoms,” produced in that part of the cutaneous or mucous tissues, to which the poison may have been immediately applied. This is followed, in a given number of cases, by one or more of a series of diseases termed the “secondary symptoms,” as inflammation of the skin, of the throat, of the eye, of the bones, or of the joints. The secretions of the primary ulcer are contagious, while those of the secondary symptoms are not contagious, except in as much as the foetus in utero is occasionally affected. The duration of syphilis varies according to the number and severity of the secondary symptoms set up, and may last, therefore, from a few days to many years.





## OF THE POISON OF SYPHILIS.

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SYPHILIS is one of the gravest diseases which affect the human frame, by means of contagion, for besides the primary affection, it often produces numerous and disgusting forms of cutaneous eruptions, strange warty growths, disease of the bones and ligaments, and destructive inflammation of the eye, the throat, the nose and of the palate. This long train of secondary and tertiary actions, was considered on the first appearance of syphilis, as so many new, distinct and dissimilar diseases, and a large portion of a century elapsed, before the primary affection was discovered to be their invariable and necessary antecedent. Indeed, so multitudinous are the forms of syphilitic cutaneous eruptions, that they were not classed till the days of Willan and of Bateman, and iritis though mentioned by Ambroise Paré is doubted by Mr. Hunter,\* as being part of the series, and is altogether omitted, even in some of the most popular and recent works of the French school. At length, however, the various and remarkable phenomena of this once formidable disease have been arranged, their laws, in a great measure, determined, and many valuable remedies, or modes of treatment discovered, so that this successful issue of the united labours

\* Mr. Hunter says, "There are inflammations of the eyes, which are supposed to be venereal, for after the usual remedies against inflammation have been tried in vain, mercury has been given, on the supposition of the case being venereal, and sometimes with success, which has tended to establish this opinion. But if such cases are venereal, the disease is very different from what it is when attacking other parts of the constitution, for the inflammation is more painful than in venereal inflammation proceeding from the constitution, and I have never seen such cases attended with ulceration, as of the mouth, tongue and throat, which makes me doubt of their being venereal.—*Hunter on the Venereal*, p. 324.



of the profession affords one of the proudest triumphs achieved in medicine.

*Remote cause.*—This disease is of modern origin, and first appeared at the close of the fifteenth century. Its eruption was so sudden, that the French who besieged Naples in 1496, considered it to be of Neapolitan origin, while the Neapolitans accused the French of having introduced it into Italy. Three hypotheses have been imagined as to its source: 1st, that it was brought to Europe by Columbus on his return from the West Indies, and was introduced by the Spaniards into Italy. Again, that being contemporary with the downfall of the Saracen power in Spain, it was engendered among the Moors, of whom a large body, when driven from the Peninsula, was allowed to repair to Rome, and to encamp without the walls in the Appian way; and, lastly, that it was the result of the loose manners and luxurious indulgences of the Italians, and broke out in the city of Rome, the then great capital of the world.

The difficulty of admitting the first hypothesis, or that syphilis is of American origin is insuperable, for no such disease is mentioned by Columbus as prevailing among his crew, or even in the West Indies—a country, besides, remarkable for the mildness of the symptoms, when the disease does prevail there. The difficulty of admitting it to be of Moresque origin is equally great, since calamities as pitiable and as overwhelming as those that befell the exiled Moors have fallen on the Jews, and on many other nations, and no such disease has resulted. The origin, therefore, of syphilis is only satisfactorily explained by assuming that it broke out in Rome about the year 1492. The combination of causes which gave rise to it are unknown, but so dissolute were the manners of the times, that in a few months, it had contaminated the whole of that great city, and in a few years, it had spread over the whole of Europe. This poison, in its habits is peculiar to man, for although many physiologists\* have inoculated dogs and cats, rabbits and pigeons, horses and asses, guinea pigs and other animals, with

\* Hunter, Turnbull, Ricord, Le Blanc.

syphilitic matter taken from the primary sore in the human subject, they have, in no instance, succeeded in producing syphilis or any similar affection in these animals. The laws of syphilis are as follows :

*Predisposing causes.*—The principle circumstances which predispose to syphilis are impaired health, peculiarity of idiosyncrasy, neglect of personal cleanliness, intemperance and climate.

In general, infection of this poison is more certain, its action more immediate, and its phenomena more severe in proportion to the enfeebled health of the party. Patients, for example, of debilitated constitutions have been known to be attacked with primary ulcer, bubo and sore throat within twelve hours after impure connection. On the contrary, there are persons so robust of health, or so peculiar of idiosyncrasy as to be almost exempted from the attacks of syphilis, however indiscriminate in their indulgences. But such cases are rare. Perhaps, the most remarkable fact of peculiarity of idiosyncrasy is the case recorded of twins, born of infected parents, one of which was covered with a syphilitic eruption, while the other was perfectly healthy. The most general data, however, we possess on this subject, is a calculation founded on an experience of thirteen years in Paris, and which gives a ratio of one in four of the “filles publiques,” infected annually, while another founded on data from 1830 to 1834, gives one in three as the proportion. Some few, it is supposed, are never infected, while others may be almost said to pass their lives in the hospitals, returning to them twelve, fifteen or twenty times, till, at last, they are lost sight of, and may be presumed either to have reformed, married, died, or withdrawn themselves from the observation of the police.\*

There can be no doubt that a want of personal cleanliness is extremely favourable to the transmission of this poison. The wide and epidemic spread of syphilis on its first breaking out, can only be explained by the dirty habits, unchanged linen, and general neglect of the person among the lower

\* Parent Duchatelet, vol. ii. p. 240.



classes of the inhabitants of every country in Europe at that period. The following anecdote from Parent Duchatelet is the *reductio ad absurdum* of this proposition. The diseases of persons labouring in the common sewers of Paris are few in number. One alone arising out of this disgusting employment can occasion death, namely asphyxia, while ophthalmia and rheumatism to which they are most liable are not dangerous and seldom severe. "Still," he adds, "there is one disease which is always aggravated in these persons, and is sometimes incurable, and that is syphilis."

Intemperance is also a great predisposing cause. A vast portion of the persons admitted into hospitals, labouring under this disease, are exceedingly addicted to drinking, and it is remarked by the sisters of these establishments, and persons well acquainted with their habits, that the women could not submit to what they are compelled to suffer unless they drank. We have it also on a high authority, that the worst forms of this disease are generally met with in young and delicate females, who lead a life of debauchery in the lowest haunts of the metropolis, injuring their constitution by drinking spirits, by late hours, and by exposure to cold and wet, with insufficient clothing. Armies also on actual service are exposed to a similar combination of injurious influences, and they often suffer in the severest manner from this formidable disease.

Climate has also a marked influence over this affection, for the admissions into the hospitals, in the Windward and Leeward command are only 35 per 10,000 of the force annually, while in Great Britain they are 181. This difference can hardly result from any superior morality in the troops, quartered at these different stations, since the black troops suffer in a still less ratio than the white force, the number treated being only half as high, or 17 per 1000 mean strength. Most of the latter force are, indeed, married men, but it is understood they are very indiscriminate in their amours. It is singular, however, in the East Indies and in the Mauritius, countries similarly situated as to latitude with the West Indies, the numbers attacked both of white and black troops are greater

than at home.\* In the navy, also, the influence of climate has been remarked to have a decided effect on the production of syphilis. "In the year 1830, in the South American "squadron," says Dr. Wilson, "there were 202 cases of venereal disease. A considerable portion of the whole of these "were in the Seringapatam, and were contracted in the South "Sea, principally at Otaheite and neighbouring Islands. "There was something peculiar in the disease there; often, "without any appearance of chancre or appreciable injury of "the genital organs, syphilitic disease was developed in the "groins; one case of syphilis proved fatal.†" Again,‡ "there "is a striking difference in the frequency, as well as "in the forms of the venereal, especially the syphilitic "form of the disease, on the two sides of South America. "On the eastern, or Atlantic side it is, comparatively, "a rare and mild disease; while in the Pacific, it is often "difficult to deal with, occasionally exhibiting peculiar features, and offering much resistance to treatment. Such "difference is common and difficult to explain, neither climate, "at least, in temperature, nor modes of life, as far as they are "known, will account for it."||

The effects of climate have likewise a marked influence upon the intensity, as well as the frequency, of this disease. The primary sore, for example, in tropical and other hot countries is always greatly mitigated, and found to heal under a treatment of sarsaparilla or other vegetable remedies, at least, such is the case in the East and West Indies.§ In Portugal, also, the mildness of the primary sore in the natives of that country, was so remarkable, that during the Peninsular war, we learnt from them the fact, of its being curable without mercury. But a similar immunity does not appear to extend to the hardier foreigner, resident among them. "In the British army," says Dr. Ferguson,¶ "it is probable that

\* Statistical Report of Sickness in the West Indies, p. 10.

† P. 6.

‡ P. 11.

|| Statistical Report of the Health of the Navy, p. 11.

§ Boyle on the Venereal, page 18.

¶ Medico Chir. Trans.



“ more men sustained the most melancholy of all mutilations  
“ during the four years it had been in Portugal, through this  
“ disease, than the registers of all the hospitals in England  
“ could produce for the last century.” Mr. Annesley, also, in  
his *Sketches of the Diseases of India*,\* speaking of this  
disease as it prevailed among the troops in the occupation  
of Bellary-Gooty, and other ceded districts of the Madras  
Presidency, says, “ venereal sores and common sores under-  
“ went an extraordinary change in this climate, for they  
“ became purple with ragged edges, bled profusely and re-  
“ sisted every application.” The natives of hot climates,  
however, do not appear always to escape with a mild disease,  
for Dr. Ferguson speaks of having seen such primary sores  
among the Portuguese, as made him shudder to look upon.

It is doubtful whether the secondary symptoms undergo  
any similar mitigation by climate, for it was remarked by our  
medical officers, when the British army was in possession  
of Lisbon, that more mutilated faces were to be seen in that  
city, than in any other of the same size in Europe. Mr.  
Boyle also,† who had many opportunities of seeing the  
disease in France, Spain, Italy, and the East and West In-  
dies, says, “ For my part, I have often been distressed in  
“ witnessing the numberless wretches I have seen in a state  
“ of lingering misery from the various forms of secondary  
“ symptoms.” In the Bermudas, out of 136 cases, nineteen  
were invalided, and three died.‡ While in India, Mr. Annes-  
ley states§ that syphilis, rheumatism and such diseases as are  
not peculiar to any part of the world, form a large portion of  
the sick, and, if neglected, are calculated to produce either a  
large non-effective list, or to increase the number of dis-  
charges from the service.

Age appears but slightly to affect the liability to this disease,  
for the infant at the breast, the adult, and even old age occa-  
sionally suffer from it. The strong passions of youth, however,

\* Page 262.

† Page 19.

‡ Edin. Med. Surg. Journ. v. 35, p. 108.

§ Page 134.

render it more common, from early adult age to thirty. The sexes probably suffer in nearly equal proportions.

*Contagious.*—Few persons doubt the contagious nature of syphilis, for it prevails exclusively among a class of individuals indiscriminate in their sexual gratifications, while it is entirely wanting in those, whose similar indulgences are guarded by a higher morality or by a purer taste. An impure connection is necessary to its existence, and the primary symptoms appear on the genital organs a few days after intercourse. These primary symptoms are proved, not to result from simple inflammation, because, in a given number of cases, they are followed by many secondary diseases, and also by the infection of the foetus in utero, phenomena consonant to the laws of morbid poisons, but inexplicable on any other hypothesis.

The doctrine of the contagious nature of syphilis is also supported by several direct experiments. Many healthy or diseased persons, for example, have been successfully inoculated with pus, taken from a primary sore. Mr. Benj. Bell and Mr. Hunter give some remarkable instances of the disease having been propagated in this manner. Of late, similar experiments have been made in Paris by three young medical students, who incredulous of the contagious nature of this disease, inoculated themselves with syphilitic poison. In one, an ulcer formed which lasted a considerable time, while in another, an ulcer followed, which being declared venereal, the party was so alarmed, that he attempted to commit suicide by opening his crural artery. Ricord, also, surgeon to the Venereal Hospital at Paris, has repeated Mr. Hunter's experiment of inoculating the diseased patient with pus, from his own primary sore, in the thigh, arm, or other healthy part. The general result, he deduces from several hundred cases is, that pus from a chancre, always produces a chancre, on the part to which the poison is applied, a conclusion supported by many similar experiments by Marion of the Military Hospital at Louvain, by Beaumès, and still more recently by Mr. Mayo.

Mr. Evans details three interesting experiments, which, in



some degree, prove the earlier the stage of the disease, the more infectious is the matter, and the severer the symptoms. He inoculated, for example, three persons with syphilitic poison. In the first of these cases, matter was taken from an ulcer of ten days standing, and the inoculated disease terminated in fourteen days; in the second, from an ulcer only eight days old, when the inoculated disease continued eighteen days, but in the third case, the matter was taken later or just before the cessation of the ulcerative stage, and the inoculated disease, continued twenty-eight days. Ricord has repeated these experiments, and affirms, as a further result, that syphilitic pus taken from a primary sore is not contagious in its latter stages, but only when the ulcer is extending or stationary, for during the process of reparation or of cicatrisation, he found inoculation produced none of its usual effects, so that he imagines, there is a period when the sore passes into the state of a simple ulcer. Beaumès has been led by his experiments to another singular result, or that pus, taken from one part of a healing ulcer is often innocuous, while that from another part will frequently communicate the disease, a result which, if established by further experiment, is an exception to the laws of poisons generally; for the poison of the vaccine pox, of the small-pox, and of the varicella, exists in the crust, the last cicatrising stage of those affections. But this doctrine is too dangerous to be relied on, and, practically speaking, no person can be considered in health till the sore has entirely healed.

The primary sore is very frequently followed by bubo, and it has long been a question, whether pus from a bubo will or will not communicate this disease. The experiments of Ricord, however, shew that when superficial ganglia, are in a state of suppuration, the specific virus may be obtained from some one of them, but not from the deeper seated ganglia which seldom suppurate and never furnish the specific virus, unless infected by the neighbourhood of the superficial ganglia. The lymphatic vessels, also, leading from a chancre are frequently inflamed, and pus from them, will produce a syphilitic ulcer by inoculation. Sometimes also a small abscess forms in the immediate neighbourhood of a chan-

cre,\* and such abscesses always furnish a specific virus. These facts seem to prove that bubo is rather the result of absorption, or of sympathetic irritation than of a secondary action of the poison. Beyond the inguinal glands, the poison has, in no instance, been traced.

Mr. Hunter has also, by many well directed experiments established that neither pus from the sore throat, the periosteal membrane, or from other secondary symptoms, is capable of producing any specific affection, and the conclusions of this great master have been verified by many British and foreign pathologists, especially Ricord, who has multiplied experiments on this point, till they amount to between three and four hundred, and has always obtained the same negative result.

Pus, then, taken from a syphilitic sore throat or other secondary symptoms, as a general principle, is not contagious. But to this law, there seems to be two possible exceptions, or the ulcerated mouth of a syphilitic child, and also the pustule muqueuse or warty excrescence of the genitals. The ulcerated mouth of a syphilitic child has often occasioned ulceration of the nipple of the nurse, that gave it suck, and this has been followed by slight or severe secondary symptoms. The cases, however, of this kind are few, and it seems possible, that further investigation of this subject may shew that the disease in its primary form, may have been contracted at the time of birth, from the mother being infected. Unless this is the case, the hereditary taint is an exception to the general law, that the secondary or constitutional symptoms of syphilis are non-contagious. The next form of secondary symptoms which is open to any doubt, is the pustule muqueuse or warty excrescence of the genitals. Wallace has inoculated with success in these affections.† Ricord has obtained similar results, and has come to the contradictory conclusion, that although not transmissible by inoculation, it is contagious by some vital process we cannot explain. He considers it to constitute a transition stage between the contagious nature of primary syphilis, and the non-contagious

\* Page 145.

† Lancet.



secondary phenomena. He has found, however, that sometimes a primary chancre does form among these growths, from which we may inoculate. Beaumès has not puzzled himself or his readers by any dull investigation of its cause, but states he has seen it spread by sexual intercourse.

The intimate nature of the syphilitic virus is unknown, but its property of infecting is not immediately lost. Ricord has preserved pus taken from a primary sore, for a considerable length of time in tubes,\* in the same manner as we preserve vaccine lymph, and at the end of seventy-three days, he has inoculated with it as successfully as with recent pus. Its properties, however, seem readily destroyed by certain chemical agents; for, he adds, every time I have inoculated with pus from a chancre, mixed with an acid or an alkali a little concentrated, it has failed. Not that those substances possess any specific property, but because they destroy all organic matters without distinction.†

*Fomites.*—The many instances which have been given of the successful inoculation of syphilis by the lancet, or by a probe armed with syphilitic matter are sufficient proofs of this disease being communicated by fomites. In some few cases, a drinking cup, a pipe, or a spoon used after a person primarily affected in the mouth, has been known to produce this disease. Ricord states, also, that the nail is sometimes the instrument of transmission, for persons affected both with the itch and with syphilis have occasionally had syphilitic sores in different parts of the body, in consequence of having inoculated those parts by scratching themselves. This physician also gives the case of a young man, fresh from the embraces of a diseased woman, who infected his mistress, he himself not having caught the disease. In this case, the party must have acted as a fomes. Women have been known to communicate the disease in the same manner to their paramours. There are, therefore, abundant proofs of syphilis being communicable by fomites.

*Susceptibility not exhausted.*—It seems proved that no prior attack, however severe, exempts the constitution in

any degree from a second attack of syphilis. Many unfortunate females are scarcely ever free from this disease. This law is determined by so many instances, that Mr. Hunter gives the following summary of the liability to re-infection. 1st. That a primary ulcer already cured or still existing, whatsoever may be the stage, does not hinder us from contracting other primary affections. 2nd. The existence of secondary symptoms, or of a constitutional affection, does not prevent the patient from contracting other primary affections; and 3rd. That the number of attacks of primary or of secondary affections is unlimited.

*Co-exists.*—The co-existence of typhus and syphilis, and of syphilis and erysipelas is of daily occurrence. Dr. Hilden relates the case of a man affected with the itch, who caught syphilis, of which he died, by laying in a bed which had been occupied by a syphilitic patient. Syphilis and intermittent fever, syphilis and vaccinia have been frequently seen combined in the same individual. The frequent co-existence of syphilis and gonorrhœa has given rise to the opinion in the minds of some pathologists, that the two poisons are identical. This doctrine is of very ancient date, and it is important to investigate its truth as being supported by the considerable authority of Mr. Hunter, who affirms that the matter of a chancre, will produce either a gonorrhœa or a chancre, and reciprocally, that the matter of gonorrhœa, will indifferently produce a chancre or a gonorrhœa.

The presumptive evidence is entirely against Mr. Hunter's opinion, for the "*foeda mulier*," or woman labouring under gonorrhœa is a person known long before the introduction of syphilis. A large number of persons also labour under gonorrhœa without suffering in any degree from the primary sore. While an equally large class labour under very severe primary symptoms without suffering in any degree from gonorrhœa. There is, consequently, no necessary connection between the two diseases. It is admitted, also, that there is a great difference in the course of the two diseases, syphilis being often followed by secondary symptoms, a circumstance



which occurs so rarely after gonorrhœa, that it is difficult to connect them as forming part of that disease.

Mr. Hunter has supported this opinion by one direct experiment, "I ordered," he says, "a person at St. George's Hospital to be inoculated with the matter taken from a well marked venereal ulcer on the tonsil, and also with matter of gonorrhœa. The matter from gonorrhœa produced a chancre, but that from the tonsil had no effect."\*

Other pathologists have repeated Mr. Hunter's experiment but with entirely different results. Mr. Benjamin Bell has given the case† of a gentleman intending to make the experiment the subject of a paper for a medical society, who took matter on the point of a probe from a chancre on the glans penis, and introduced it into his urethra with the expectation of producing a gonorrhœa. "At the end of eight days, however, a large chancre was discovered in the urethra, and a few days after a bubo formed in each groin, but no discharge whatever took place throughout the disease." In another case, a gentleman inoculated himself three times on the prepuce and glans with matter of gonorrhœa, without any other result than a slight inflammation which quickly subsided, but chance rendered the result more fearful than was anticipated; for the matter in this last inoculation found access into the urethra, and affected it with gonorrhœa. Some experiments of Ricord, show, indeed, that matter of gonorrhœa has produced, as in Mr. Hunter's case, an ulcer on the penis, but as a general result, he infers, that matter taken from a primary sore, follows an entirely different law from that of gonorrhœa; for out of 635 persons inoculated with gonorrhœal matter on the arm or leg, in no instance did a chancre follow. Marion also inoculated eighty cases with gonorrhœal matter, with an equal want of success. The mass of evidence, consequently, against Mr. Hunter's solitary experiment is overwhelming and absolutely conclusive against the identity of the gonorrhœal and of the syphilitic poisons.

\* Hunter on the Venereal, p. 294.

† Vol. 1, p. 438.

The great argument in favour of Mr. Hunter's hypothesis is, that two healthy persons having had illicit intercourse with the same female, a gonorrhœa has been the consequence in the one, and a primary ulcer in the other, while a third party, perhaps, has been affected with both diseases, and yet the communicant has been found on examination, to labour only under a slight gonorrhœa. These accidents have often happened, but Ricord affirms that by using the speculum uteri, this enigma is at once solved. He states that the cases of this kind which have fallen under his observation have been numerous, and that, in every instance, where a chancre has resulted, he has found ulcers deep seated in the posterior portion of the vagina, or on the mouth or neck of the uterus.\* In the instances, also, in which the female has been primarily infected from supposed gonorrhœa in the male, chancres have occasionally been found in the urethra of the infecting party; or else a strict cross examination has shown some superficial ulceration existed at the time, and which had healed so rapidly as to have been neglected or forgotten. Looking, therefore, to the many different sources of error, it is impossible to admit that the *one* fact adduced by Mr. Hunter, or even a small number of facts, can, or ought to overturn a general law. At most, they are exceptions, difficult to be explained, but are too unsure to be made the basis of a new principle. There can be no question, however, that the matter of gonorrhœa will occasionally produce an ulcer, like many other irritating causes; but it is not satisfactorily proved that such ulcer is of the same specific nature, and will be followed by secondary symptoms, in the same proportion as after syphilis. The converse of the proportion also, must be shown to be true, or that the matter of chancre will produce a gonorrhœa, before we can consider the two poisons as identical. Mr. Hunter, in the absence of any strong fact has attempted to support his hypothesis by asserting that the opposite results of gonorrhœa and of chancre depend on difference of membrane or on difference of state of the same membrane, by which the poison is

\* P. 18.



absorbed—absorption by a sound surface, producing gonorrhœa, and by an unsound surface, a chancre. But these distinctions are not intelligible, and have no analogy with the laws of any other known poison. The poison of small-pox, for example, produces the small-pox, introduce it how you will—and the poison of the plague, nothing but the plague. The mode of introduction may modify the phenomena, but does not change the essential character and nature of the disease.

*Modes of Absorption.*—The poison of syphilis is in general introduced into the system by means of the cutaneous and mucous tissues or by a wound or ulcer. The mucous membranes of the penis, of the labia, of the urethra, of the anus, lips, tongue, eyes and throat have all been affected, and are the principal seats of primary syphilis. Boyer gives a singular case of a young man infected by the bite of a woman primarily diseased in the mouth, and whose embraces he avoided.\* The mucous membranes, however, covering the genital organs, are, for obvious reasons, those by which the poison is most usually absorbed. Every part of the cutaneous tissue, besides that of the genital organs, also, may be the seat of the primary sore, as that of the cheek, mammæ, abdomen, perineum, arm or leg. Mr. Hunter gives the case of a midwife who caught a chancre on her right fore finger, and who communicated the disease to no less than eighty puerpural women in the course of her business. Surgeons, also, are known, in examining infected persons, to be liable to similar accidents. Mr. Hunter likewise affirms,† that venereal matter is more readily absorbed when applied to a fresh wound than to an ulcer, in this respect resembling the inoculation of the small-pox, “for the common matter, from the sore, may remove the venereal matter. This experiment,” he adds, “I have made several times, and have only once produced the venereal inflammation.” The poison, therefore, being applied to a recent wound, to an ulcer, or to the sound cutis, or to a sound mucous membrane under given circumstances, is absorbed and infects the system.

\* *Traité de Syphilis*, p. 100:

† P. 19—21<sup>r</sup>.

But while most pathologists admit the fact of absorption, they are divided as to the time and circumstances attending it. Mr. Hunter, for instance, contends that the poison originally applied, is not absorbed, but lies in the part and produces only ulceration; and that the pus secreted by the chancre, so produced, is that which is absorbed, and subsequently contaminates the constitution. This hypothesis has been defended on the ground that the primary pustule in inoculation for the small-pox is strictly a local disease, and if destroyed before the eruptive fever commences, the further progress of the disease is prevented. But this supposed fact is not established, and if there is any analogy between the poisons of small-pox and of cow-pox, the argument is inapplicable; for the experiments of Bousquet have shewn that after the insertion of the vaccine virus, the disease runs its course, notwithstanding the most active means which have been taken to prevent absorption by cauterization—the application of strong acids, or the continued use of the cupping-glass.

This hypothesis would be unimportant, had not Mr. Hunter founded upon it a therapeutical axiom, namely—that the early cauterization of the ulcer would convert the primary sore into a simple sore—anticipate all absorption of the poison, and prevent the occurrence of any secondary symptoms. But if we look to the times in which the different authorities affirm this operation may be performed with success, we find such a variety of opinion as altogether to shake our confidence in this operation as a prophylactic remedy against the secondary symptoms. Mr. Hunter seems, for example, to imagine that the contamination of the constitution may be prevented by excising or cauterizing the primary ulcer within a month after its first formation. Mr. Wallace, on the contrary, states\* that he has destroyed the primary ulcer and healed the part within ten days after the first appearance of the disease, and yet an eruption has followed. Ratier even affirms that these operations are useless unless performed on the very first vestige of the

\* *Lancet*, July 30, 1836



disease; while some authorities affirm that this mode of treatment, only the more frequently induces secondary symptoms. The use, also, of the knife and of the caustic, is of very ancient date, and is still continued in the French armies, but does not seem to have lessened the frequency of constitutional lues.

The more usually received hypothesis, or that the poison is immediately absorbed even by a sound surface, and the primary sore only the first indication of the contamination of the system—is supported on much stronger grounds, and by a stricter analogy with the laws of other poisons. The rapid absorption of poisons is among the best established facts in medicines. Hydrocyanic acid, for example, destroys the party taking it in a few seconds, and oxalic acid, corrosive sublimate and arsenic in a given dose, although often immediately rejected by vomiting, still in many instances, causes, in a few minutes, or in a few hours, the inevitable death of the patient. Every poison, also, that produces secondary actions, affects primarily the constitution, before any local disease is set up, as that of fever, small-pox, or measles. This doctrine, also, is still further confirmed by the poison of syphilis having been absorbed, and produced syphilitic affections, as the *bubo d'emblée*, without any primary ulcer whatever having preceded—a fact, which is admitted even by Mr. Hunter. The weight of evidence, therefore, seems to establish as the law in syphilis, that the constitution is first infected, and that the primary and secondary symptoms are only the indications of the contamination of the system.

The poison of syphilis being absorbed and mingled with the blood, Mr. Hunter is of opinion that it is now carried in the round of the circulation to the parts for which it has a more direct affinity—disposes them to certain diseased actions, and is then immediately removed from the body. It is unquestionably true that many medicinal substances are quickly removed from the body, as the hydriodate of potash or alcohol; but it is not shown that they lay the foundation of curative actions to be set up long after their removal. This position, therefore, of Mr. Hunter is so little capable of proof or of disproof,

that it is to be regretted he should have proposed it. Indeed, the ways of nature are so recondite, that it is improbable we shall ever penetrate her mysterious workings in the production of diseased actions, so that whether poisons continue to infect the blood as long as the tendency to any primary or secondary affection lasts, or whether they are, at once, removed from the body and merely impress actions to disease on the parts ultimately affected—are facts so dimly marked, as to be for ever impenetrable.

*Period of Latency.*—Ricord says\* when a chancre is the result of inoculation, there is no period of incubation, for the evolution of the primary sore commences from the moment of the insertion of the poison. It would seem, consequently, that the inflammation produced by the puncture, has hardly time to subside before the formation of the pustule commences. This, however, does not coincide with the facts observed when the disease is communicated under ordinary circumstances, and by means of a sound membrane—for the period usually observed to elapse after connection, till the appearance of the primary sore, is from four to eight days. “As extreme periods, I have known cases,” says Mr. Hunter,† “when chancres have appeared twenty-four hours after the application of the matter, and others, when it has been seven weeks.” If it be the frænum or the termination of the prepuce into the glans that is affected, the disease will, in general, appear earlier, these parts being more easily affected than either the glans or common skin of the penis or scrotum, for, in some cases, where both the glans and prepuce have been contaminated by the same application of the poison, it has appeared earlier on the prepuce.

The period of latency which elapses before the secondary symptoms manifest themselves, is usually long after the cure of the primary sore, or, perhaps, from six weeks to six months. In many cases it is much later, and in others much sooner. Mr. Hunter gives the case‡ in which a gentleman had a chancre and a swelling in the groin, and within a fortnight

\* P. 92.

† P. 218

‡ P. 317.



venereal eruptions followed all over the body. Mr. Hunter, however, estimates the period at which the skin and fauces take on the diseased action to be on a medium, six weeks after the mercurial irritation that cured the primary sore has subsided, and in the bones to be about twice that time. Syphilitic iritis appears to have been unknown to Mr. Hunter, and usually occurs after the periostitis or affection of the bones is cured.

Such, perhaps, may be the general law, but cases are numerous in which the period of latency of the secondary symptoms, and especially before the whole series is exhausted is often singularly long. We constantly meet in the London Hospitals with cases in which two, three and four years have elapsed between the termination of the primary and the appearance of the secondary affection. The following case is an instance of a still longer period. A gentleman, shortly after the battle of Waterloo, laboured under a primary ulcer, which yielded, in a few days, to blue pill and sarsaparilla. In 1831, however, he was attacked with syphilitic psoriasis of the leg, and with periostitis of the lower third of the tibia. It is morally certain that no second infection took place in this case, so that fifteen years must have elapsed between the subsidence of the primary, and the occurrence of the secondary symptoms. Mr. Abernethy also gives a case, in which the period of latency was of a similar length. It follows, therefore, that although many cases of syphilis may run their course in a few days or weeks, still there are others in which months and years elapse between each successive attack, so that a great part of life may pass away before the effects of the poison are entirely exhausted.

*Pathology.*—The theory of syphilis is, that the poison is absorbed and mingles with the blood, after which, a certain period elapses when it produces a specific inflammation in the part to which it was applied, and by which it was more immediately introduced into the system. This inflammation terminates in the production of the primary sore or chancre. The primary sore being healed, the disease is, in many cases, at an end, and the poison eradicated. But in a considerable number of

instances it remains, circulating in the system in a latent state, disarmed, indeed, of its power of producing any further primary disease, but still possessing the property of producing at varying, and, sometimes very distant periods, many secondary affections of different tissues as of the skin, the throat, the nose, of the bones, the periostum, the ligaments, and also of the eye : not, however, that the whole of this long series is always set up, for the poison more commonly exhausts itself on one or two tissues only. Such is the theory of this disease, and from the two different orders of phenomena that arise, syphilis is divided into primary syphilis, and into secondary syphilis. The proofs on which it is founded are as follows :

The proofs of the law, that the poison of syphilis mingles with the blood, are the long series of secondary symptoms which is occasionally set up at very different and distant periods from the time of contamination, and also the infection of the fœtus in utero.

The infection of the fœtus in utero with secondary symptoms is admitted even by Richond, who states that according to the calculation of M. Chateauneuf, the proportion of children born with syphilis, is seventeen in one thousand of those admitted into the Hôpital des Enfants Trouvés. One of the most remarkable instances of this infection is given by Merklings. It is that of an "unfortunate female," who being pregnant and labouring under secondary symptoms, died suddenly in consequence of some food passing into her trachea. The body was examined, and the fœtus discovered to be suffering from secondary symptoms, the bones in different parts being in a state of exostosis.\*

Secondary symptoms may be transmitted from the parent to the child under many different circumstances. The father, for example, being separately diseased, or the mother being separately diseased, may equally transmit them—and, *a fortiori*, if both parents are diseased. It is apprehended that they may be communicated either at the time of conception, or at some more advanced period of pregnancy ; and also

\* Bertin, Traité de la Maladie Vénérienne, p. 514.



that they may be equally imparted, whether the parent be labouring under primary or secondary syphilis; but not when the poison is latent. The following case, however, seems to disprove this latter limitation.

“A young gentleman,” says Mr. Foot, “recently cured of primary syphilis, married a beautiful lady of the strictest virtue and of the soberest education. Within the first twelvemonth they had a son born perfectly healthy, and who continued so. This was followed by three miscarriages, till at the end of the third year, she was delivered of a female child with an eruption on her face—sores at the angles of the mouth, and an affection of the nose, so that Mr. Foot and two other surgeons, who saw the infant, declared the disease to be syphilis. The gentleman had, during the first year of his marriage, often complained of head-ache and symptomatic fever, but within a month after the child was born, he had offensive discharge from his nose and palate, while a large node formed on his forehead, with thickening of the elbow-joint and nocturnal pains.” The father and child were both treated with mercury, and both recovered, but the former lost his palate.

The affection of the fœtus in utero is easily understood when the mother is labouring under syphilis; but the circumstance of the infection of the fœtus by the male parent—the mother being in good health, is extraordinary. In a physiological point of view, it seems to lead to the doctrine, that the impregnation of the female must take place in consequence of the seminal fluid being carried in the round of the circulation to the ovum, which is thus fœcundated in situ. There seems, however, no doubt of the fact, “for,” says Dr. Mahon, physician to the Venereal Hospital, Vaugivard, “it is seen every day that children are born with symptoms of a confirmed pox, while the mother has not had the least symptom of it. Children,” he adds, “infected in this manner, seldom go the full time of utero-gestation, for many die and are in a state of putridity, while some are born so wrinkled and emaciated, that they exhibit the appearance of extreme old age.” More commonly,

however, the children are born healthy, and the symptoms appear about the end of the tenth or fifteenth day, and more rarely at the end of a month; and according to Boyer,\* sometimes not till the end of many months.

The symptoms which characterize secondary affections in the infant, have been so little studied, that it may be as well to state the few facts which are recorded on this subject, for their want of distinct nosological characters defies arrangement. At the end of a given but short period, a copper-coloured eruption appears principally about the parts of generation—the anus, the lips, the mouth and eye-brows, which has a circular form, and has a tendency to spread by ulceration and to scab, especially in the folds of the thigh, arm, or abdomen; ulceration also occurs in the mouth, which spreads over the lips, throat and nostrils, so as to impede the child's sucking and to alter its voice—there is sometimes, also, a discharge from the ears. In addition to these symptoms, Mr. Lawrence has twice seen iritis; Dubois' perforation of the septum nasi; Bertin, periostitis; while Mr. Mayo has seen small glistening flat tubercles and psoriasis.

The cases of syphilitic affection of the foetus are, therefore, not uncommon, and no doubt can exist of the truth of the law—that the poison of syphilis is absorbed and mingles with the blood.

The law, that the poison produces a specific inflammation in the part to which it has been applied, and by which it has been introduced into the system is so universal, that it has been doubted whether it has any exceptions. Mr. Hunter thinks the poison may be absorbed, and the glands of the groin inflame without any primary sore having preceded. Ricord states that although the "*bubo d'emblée*" is not unfrequent about the fifteenth or twentieth day after connection, yet on examination some form of primary ulcer is usually found on the glands or prepuce. This pathologist, however, admits that buboes are formed under suspicious circumstances, when it is impossible to discover any antec-

\* P. 108.



dent or concomitant primary sore. Such buboes, however, he contends, generally take place in the deep seated ganglia, and not in the superficial ganglia, and have little tendency to suppurate, or when pus does form, inoculation is not followed by the characteristic ulcers. Beaumès, on the contrary, gives three cases\* of *bubo d'emblée*, from which pus was taken, and produced the venereal ulcer by inoculation. The parties, he observes, were all in good health, had no trace of primary affection, nor any previous glandular enlargement—and, consequently, the bubo seems to have had no other source than the antecedent connection.

The law, that secondary symptoms follow the occurrence of the primary sore in a given number of cases, is unquestionable; but the proportion they bear to each other, however curious the problem, is not determined; but taking the returns of the army as the most preferable data, the ratio is as follows:—

Diseases.	Dragoon Guards.	Gibraltar.	Malta.	Ionian Islands.	Windward & Leeward Command.	Jamaica.	Bermuda.	Nova Scotia — New Brunswick	Canadas.
Syphilis Primitiva.	1415	749	1806	826	342	284	31	476	852
Ulcera penis non-syphilitica.	2144	416	1351	876	503	81	93	1087	2551
Syphilis consecutiva.	335	193	115	108	97	11	3	87	123
Ratio of syphilis consecutiva to syphilis primitiva.	1 in 11	1 in 6	1 in 28	1 in 17	1 in 8½	1 in 36	1 in 41	1 in 18	1 in 28

Or taking the calculation altogether, it gives a result of one attack of secondary symptoms, for ever tenth person in the Dragoons and Dragoon guards, or taking the army generally of one in every fifteen person attacked with an ulcer on the penis whether considered syphilitic or otherwise.

#### PRIMARY SYPHILIS.

The primary ulcer is so much influenced by the constitution of the patient—his present state of health, and, perhaps, by some modification of the poison, that it is difficult to give any generic description of it. We should imagine that chancres, resulting from inoculation, must be

most uniform in their phenomena. Ricord, however, states that although chancres, from inoculation, give as a general rule a characteristic ulcer, yet they often present differences so great,\* as apparently to constitute different diseases. Indeed, he adds,† it is not the form, the induration or other material circumstance which denotes the chancre, but rather the pus it secretes and the poisoning it gives rise to. All other conditions vary, the secretion and its results alone remain identical.

A primary sore, contracted under ordinary circumstances, and from the same source, may take, in different persons, even in the first stage, many different forms. Sometimes it is an excoriation so slight as hardly to attract the notice of the patient—or a pimple forms, which itches, or a pustule which contains pus, and which being broken, encrusts, and this encrustation conceals an eating ulcer. The primary ulcer, which, at length, succeeds, is still more various, and may take every character, from the superficial, patchy excoriation, to the deep, wide-spreading, phagedenic, gangrenous ulcer, destroying the entire organ; so that the true venereal sore is not to be defined and often not to be distinguished from that which is known to be spurious. Nosologists have attempted to arrange these many different varieties into different species, but are so little agreed, that Lagneau divides them into two, Boyer enumerates three, Mr. Carmichael four, and Mr. Wallace twenty different species or forms. Most practical writers, however, divide them into three, or into the unindurated, the indurated, and the phagedenic primary ulcers. Mr. Evans has introduced the term *venerola* to designate the primary symptoms, and as a generic term, is unquestionably desirable, it is, perhaps, as well to adopt it, and, in this case, the proper appellations must be *venerola simplex*, *venerola superficialis*, *venerola indurata*, and *venerola phagedenica*. The unindurated ulcer comprises the *venerola simplex*, or simple venereal ulcer, and, again, the *venerola superficialis*, or the

\* P. 134.

† P. 91.



patchy, superficial excoriation of the glands and prepuce, usually termed spurious gonorrhœa. The following is the most usual form and course of the unindurated ulcer.

The *venerola simplex*, or the unindurated or common primary venereal ulcer (the *venerola vulgaris*, and *ulcus elevatum* of Mr. Evans), cannot be better described than in the words of that gentleman. “This disease is more frequently met with than all other ulcerations of the parts of generation put together, and may be seated on any part of the body to which its cause may be applied; accordingly, though it is most frequently found upon the body of the penis, the inner or outer surface of the prepuce, and on the scrotum, yet I have met with instances of it on various parts of the thighs.

“Its progress may be divided into four stages. First, the pustular; second, the ulcerative; third, the elevated or granulating; and fourth, that of depression and of cicatrization.

“The first stage comprises the first four or six days of the disease, and usually commences from three to seven days after connection; it begins with itching and redness, followed by the formation of a spherical pustule, surrounded with an areola.

“The second stage is ushered in by the formation of a scab, which supplies the place of a pustule; under this, the ulcerative process continuing to go on, the accumulation of matter sometimes causes considerable pain, until it forces its way out by the bursting of the cuticle, or by a portion of the scab being otherwise detached. The scab acquires, at each time that this oozing takes place, some degree of enlargement by an additional concretion of matter; its form is oftentimes irregular, though generally it inclines to the circular. When first formed, it is rather sunk in the centre, until, by repeated accumulations, its thickness becomes sufficient to counteract this appearance—it varies in its colour according to its age, being, when newly formed, yellow; but afterwards, becoming darker and darker, until nearly black, the shade deepening towards the centre.

“It is in this stage of the disease, that these cases are

“ most frequently admitted into hospitals, when, if the  
“ scab be removed, a concave ulcer, of the oval or circular  
“ figure, with its surface of a glossy brown, an unhealthy red,  
“ or what is more frequent, of a dirty yellow colour, is  
“ exposed.

“ The termination of this, and the commencement of the  
“ third stage, which usually takes place about the eighth or  
“ tenth day, is marked by an elevation of the edge, and a  
“ filling or rising up of the surface of the sore, which  
“ eventually becomes seated upon a fungus raised above the  
“ level of the surrounding parts ; it is in this stage, and by  
“ these marks, that this ulcer may be distinguished from  
“ every other sore affecting these parts.

“ The elevation of the edge and surface is, oftentimes,  
“ considerable ; and when the sores are situated on the  
“ external parts of the prepuce, the body of the penis, the  
“ scrotum, &c., is not unfrequently marked as strongly as in  
“ figures *a. b. c. d.* &c.

“ The edge, in this stage, is frequently not only above the  
“ surrounding parts, but also above the surface of the ulcer,  
“ and in these cases it is thick, and the whole gives to the  
“ eye a false impression of induration ; at other times it is  
“ even with the surface of the sore, but is seldom below it ;  
“ the first is more frequently met with when the sore is  
“ external, the second and third, when on the inner surface  
“ of the prepuce.

“ The base and edges are usually of a dark red colour,  
“ and until about the fourteenth day, are most frequently  
“ surrounded by an efflorescence or areola, partaking, more  
“ or less, of the same tinge. This is most easily and fre-  
“ quently to be observed when the disease is seated on the  
“ outer part of the prepuce or body of the penis.

“ As from the eighth to the tenth day, the ulceration has  
“ usually attained its greatest extent, so it is from the four-  
“ teenth to the eighteenth, the sore has usually risen to its  
“ greatest height. There are, however, many exceptions to  
“ these rules.

“ Though the ulcerative process ends when the granulating



“ or elevated stage commences, it is not always that the sore  
“ has then arrived at its largest size ; for I have seen it, when  
“ situated externally, immediately upon rising above the  
“ surrounding parts, expand so as to hide the lower part of  
“ its base, which had, in consequence, an appearance as if a  
“ ligature were tied tightly about it, giving the sore the  
“ resemblance or figure of a mushroom.

“ When this sore has attained its greatest height, it re-  
“ mains stationary for an uncertain time, after which, it gra-  
“ dually though, perhaps, very slowly, declines and heals,  
“ which process forms the fourth stage.

“ When this disease has been situated on the outer skin  
“ of the prepuce, the body of the penis, the scrotum, or  
“ other place, where there is a certain density of cuticle,  
“ though, for a time, there remain a thickening of the part,  
“ it eventually goes off, leaving a permanent depression,  
“ resembling that left by the cow-pox or variola.

“ The degree of pain, attendant on these sores, differs in  
“ different subjects, but it generally subsides on the coming  
“ on of the third or granulating stage.

“ When the disease occurs in the inner surface of the pre-  
“ puce, the ulcerations are, with few exceptions, much  
“ smaller than when they take place externally.

“ When situated behind the glans, at the junction of the  
“ integuments with the body of the penis, this ulcer has  
“ oftentimes, in its second stage, an excavated appearance,  
“ like the calix of an acorn. In these cases, there is often a  
“ great degree of hardness pervading it ; which, however,  
“ continues no longer than through this stage, generally disap-  
“ pearing on the commencement of the third.

“ When on the inner part of the prepuce, the frænum,  
“ or any part behind the glans, except that just spoken of,  
“ this sore has not the deep cupped appearance mentioned.  
“ On the contrary, it is often so little concave as to make it  
“ doubtful whether it arises from this particular poison, or  
“ from some other cause.

“ Whatever may be the seat of these ulcers on the inner  
“ part of the prepuce, their characters are seldom doubtful

“ after the ninth day ; when by drawing the skin well back,  
“ and making allowance for the form of the parts, the raised  
“ edge and surface cannot escape detection ; for though they  
“ may not be plainly discernible all round, they will be so on  
“ some one side.

“ Their characteristic in the third stage, when on the  
“ inner surface of the prepuce, or behind the glans, though  
“ always sufficiently marked, is, at the same time, much less  
“ strikingly so than when they are situated externally.

“ When they happen by the side of the frænum, they  
“ almost invariably ulcerate through it, and oftentimes destroy  
“ it altogether.

“ They are, as a general rule, more irritable, painful, or  
“ sore to the touch, when behind the glands or on the inner  
“ surface of the prepuce, than when on the external skin.

“ When this sore attacks the prepuce and glands at the  
“ same time, as it very frequently does, it has two different  
“ appearances in its third stage ; for while that portion  
“ situated upon the prepuce, will assume all the charac-  
“ teristics of this ulcer, that affecting the glans will continue  
“ below the surrounding parts, and, for a certain time, be  
“ more disposed to ulcerate than granulate ; and when granu-  
“ lation takes place, it will be accompanied by the healing  
“ process, instead of that elevation of the edge and surface  
“ which distinguishes, in other parts, this sore from all  
“ others.

“ I have, however, seen these ulcers on the glans, with  
“ the elevated edge and surface well marked, but these ex-  
“ ceptions being rare, they must depend on some peculiarity  
“ in the state of the parts, or in the constitution of the  
“ patient.

“ In this affection, the diseased action, in many instances,  
“ extends a considerable distance beyond the seat of the  
“ sore. Thus, if leeches be applied to the groin for the  
“ reduction of a bubo, the wounds made by them will often  
“ become so many venerolic sores, which will go through their  
“ several stages with more or less regularity.

“ The time required for healing these ulcerations, is gene-



“ rally from four to six weeks ; it is seldom they will get well  
“ sooner than the first period, or that they will require longer  
“ than the last, though, occasionally, they do both. Though  
“ this disease generally runs its course so mildly, that except  
“ bubo form, the patient is not aware of any derangement  
“ in his system, yet, sometimes, a high degree of constitu-  
“ tional irritation takes place, which is most frequently the  
“ forerunner of an eruptive affection.”

*Venerola superficialis*.—“ This disease, which I consider as  
“ a variety or a spurious form of the preceding, begins by the  
“ formation of a pustule or vesicle, which breaking, forms a  
“ crust, under which, the cuticle is further gradually removed,  
“ in a circular or oval form. The surface of the sore, when  
“ exposed, is usually found of a healthy red colour, and is level  
“ with the surrounding parts, having exactly the same appear-  
“ ance as we have after the removal of the skin by the  
“ application of a blister. The size is mostly that of an En-  
“ glish shilling ; yet, if neglected or ill-treated, more par-  
“ ticularly when the constitutional symptoms run more than  
“ usually high, there is every likelihood they may increase to  
“ a much greater extent.

“ The principal changes which take place in the appear-  
“ ance of this ulcer are occasioned, first by the approach of  
“ gangrene ; secondly, by the commencement of the healing  
“ process ; and thirdly, by its assuming the marks of ve-  
“ nerola vulgaris in the third stage. In the first of these, the  
“ sore puts on a livid appearance ; in the second, the surface,  
“ instead of remaining level with surrounding parts, sinks  
“ below them, and thus a lasting depression is formed ; and  
“ in the third there is an elevation of the edge and surface,  
“ along with an amelioration of the general health.

“ It was the circumstance of seeing it assume this last  
“ appearance, coupled with the depression left on healing, that  
“ induced me, in the first instance, to consider this ulcer as a  
“ variety of venerola vulgaris ; an opinion which I hold now  
“ to be confirmed by the clear resemblance subsisting between  
“ them in all the most material points. For, in the first  
“ place, their shape is similar ; secondly, the vesicular or pus-

“ tular origin is common to both ; thirdly, there is a second  
 “ or ulcerative stage in both ; and fourthly, the third  
 “ stage or that of depression and cicatrization, is the  
 “ same with the fourth stage of the other disease, so  
 “ that when the pit, left on healing, is added to the other  
 “ points of similitude, the stage of elevation will alone be  
 “ wanting to perfect the parallel. It would then appear, upon  
 “ the whole, that this ulcer is a variety of the venerola vul-  
 “ garis, or venerola superficialis.

“ Phymosis occasionally accompanies all these forms of di-  
 “ sease, and renders it impossible to determine from what  
 “ source the discharge flows, whether from an ulcer, a chan-  
 “ crous excoriation, or from the urethra, and is merely a  
 “ simple gonorrhœa. It, however, frequently proceeds from  
 “ all these affections at the same time. Bubo is, likewise, a  
 “ frequent, though by no means a constant attendant on these  
 “ forms of primary ulcer.”

This class of disease, often healing without mercury, in all probability embraces the numerous sores which the army surgeons describe under the head of *ulcera penis non-syphilitica*, and which constitute more than a moiety of all those treated by them. In civil life, they are calculated to form nearly three fourths of the whole number of primary ulcers treated. There are the sores which Mr. Abernethy says he never saw followed by an example of secondary symptoms, which Mr. Evans affirms are not followed by consecutive disease when mercury is abstained from, and which Mr. Skey declares are followed “ by no secondary disease whatever.” Mr. Carmichael, however, assures us he has often seen them followed by secondary symptoms ; and, if his deductions be true, iritis is one of their most frequent consequences. All modern writers, however, are now agreed that the unindurated primary sore is, with few exceptions, best treated without mercury.

The *venerola indurata*, or indurated chancre, as described by Mr. Hunter, is admitted to be so correct, that every word is descriptive. It is as follows :—“ This, like most other  
 “ inflammations which terminate in ulcers, first begins with



“itching. The itching is gradually changed to pain; the  
“surface of the prepuce is, in some instances, excoriated,  
“and afterwards ulcerates; in others, a small pimple or  
“abscess appears on the glans, which forms an ulcer. The  
“sore is somewhat of a circular form, excavated, without  
“granulations, with matter adhering to the surface, with  
“a thickened edge and base. This hardness, or thick-  
“ening, is very circumscribed, not diffusing itself gradually  
“and imperceptibly into the surrounding parts, but termi-  
“nating rather abruptly.”

The hardness varies greatly, according to the structure of the part on which the ulcer is situated. On the glands, for example, it may be altogether wanting, and is often inconsiderable, while on the prepuce, it is common and frequently extensive; and this difference is strikingly marked where the same ulcer has involved both the prepuce and the glands; for then the preputial portion is often seen extensively indurated, and like cartilage, while that of the glands is soft and flexible. In some cases, the induration varies from that of a sixpence to half-a-crown, and even more; and when occupying the prepuce, occasionally prevents, in any degree, the retraction of that membrane.

Chancres are often met with, in which the ulceration is inconsiderable compared to the extent of the induration, and instances of an indurated knob, or tubercle of considerable size, have been seen on the penis, without any visible ulcer, and these have been followed by secondary symptoms. Mr. Carmichael, however, is of opinion, that in these cases, a small ulcer has existed on the callous part, and which has been overlooked. But this is not always the case, for the induration sometimes precedes the ulceration, occasionally succeeds to it, and often remains a long time after the ulcer has healed. This induration is always an unpleasant symptom, and is as much a part of the disease as the ulcer itself, for the patient is liable to relapse as long as the hardness remains.

The Hunterian chancre is always an indolent ulcer, slow in its course, and seldom terminating in less than from thirty to fifty days; according to Mr. Hunter, it is later in ap-

pearing after absorption of the poison than most other venereal ulcers, and he states an instance in which he conceives seven weeks must have elapsed after connection before its appearance. Its seat is generally the frœnum, glands, prepuce, and common skin of the body of the penis, and sometimes of the fore part of the scrotum—"but I think," says Mr. Hunter,\* "most frequently on the frœnum and in the angle between the glands and penis." Phymosis and inflammation are less frequently attendant on this primary affection than upon those ulcers which are destitute of its characteristic marks. This class of ulcers is supposed to be more frequently followed by secondary symptoms than either of the other forms, and is very generally beneficially treated by mercury.

The *venerola indurata*, though considered by Mr. Hunter from its marked character, as constituting more particularly the syphilitic ulcer, is comparatively of rare occurrence in the present day. All writers are agreed on this fact; and Mr. Skey says that during the last three years of the life of his lamented friend, Mr. Earle, when he had under his charge his three venereal wards in St. Bartholomew's Hospital, he is confident that induration was not present in a twentieth part of the many hundred cases he treated during that period. "I mean the induration," to retain Mr. Hunter's own words,† "being very circumscribed, does not diffuse itself gradually and imperceptibly into the surrounding parts, but terminates rather abruptly." Again, he adds, "but of more than a hundred cases I have examined, during the last three months, of venereal sores, only three exhibited induration."

The *venerola phagedenica*, or phagedenic ulcer, has two forms, the ulcerative and the sloughing, and they are both important from their destructive actions and intractability of treatment. The phagedenic ulcerative sore is one of the primary forms of syphilis, and is, likewise, a condition which may arise in the course of any and every other form of primary syphilis.

\* P. 217.

† Medical Gazette, 1839, p. 235.



Mr. Carmichael states, that, notwithstanding the vast number of primary phagedenic ulcers which had fallen under his observation, he had few opportunities of witnessing their commencement; and, consequently, that he is ignorant whether they first appear as a pimple, a pustule, or a vesicle. In two or three cases, however, he has seen a small excavated ulcer covered with a white adhesive matter precede the phagedenic state. In general, the phagedenic state once formed, the ulcer is not cupped, but superficial, without granulations or surrounding induration, and is characterized by its nibbled, jagged edges. It sometimes spreads with most destructive rapidity, but more commonly creeps on slowly, and may remain stationary for many days, or even weeks. The action of this ulcer is most capricious; sometimes it spreads in every direction—at others, it heals in one part, while it spreads in another, so that its edge is often convex on one side, and concave on the other; and hence the term “horse shoe ulcer,” and by other pathologists, “the serpiginous ulcer.” “When proceeding favourably, the secretion,” says Mr. Skey, “is small “in quantity, and possesses the ordinary qualities of pus, but “should the quantity be larger, and the matter more viscid “and adherent, it indicates an unfavorable condition, and shows “a tendency to spread.” This tendency to spread is sometimes quite extraordinary. Mr. Babington, in his valuable notes to Palmer’s edition of Hunter’s work, states, “that this “form of ulceration sometimes burrows between the body of “the skin and of the penis, dissecting, in its course, the corpus “cavernosum from the integuments, creeping upwards from “these parts, as far as the os pubis,” under these circumstances “the part which is within view is generally clean, “sometimes, slowly healing, while the portion which is concealed is foul and yellow, and secretes large quantities of a “thin brownish discharge. This spreading edge is attended “by the usual tumefactions, which may be felt externally, as “hard as a ring, encircling the body of the penis, marking “the distance to which the sore has extended. As long as “this thickened edge is to be felt, so long the sore is spreading. If the bottom of the sore lessens and tends to heal,

“the improvement may be known by the subsidence of the thickening, as immediately and as certainly as if the whole surface was exposed to view.”

This ulcer is often attended with a swollen state of the part affected, by pain, and by some fever. It more frequently attacks the glands penis than any other part, and sometimes effects its total destruction, and its depredations are seldom stopped till the prepuce is involved, and partially, or entirely consumed. When this latter event takes place, the ulceration usually receives a sudden and permanent check. At other times, a spontaneous hæmorrhage, owing to the destruction of the coats of an artery, occasions a favourable change; more rarely, this ulceration will proceed until the entire penis is destroyed. Another characteristic of this ulcer is the frequent return of the ulcerations after the part has healed, and in the very spot first affected. The course of this ulcer, though sometimes rapid, is frequently slow—creeping for four, six; or eight months, and even longer, from one part to another, alternately healing and ulcerating, and leaving deep furrows, yet without destroying, as it more usually does, the parts it attacks. A mercurial course in the phagedenic ulcerative form of the venereal disease, is very generally admitted to be pernicious, “And there is scarcely a day,” says Mr. Carmichael “in which I do not see some fresh instance of a constitution broken down by reiterated and protracted courses of this mineral, for this species of venereal disease.”\* It is, also, supposed to give rise to the most formidable of the secondary symptoms. This description of ulcer is also remarkable for the absence of buboes. “As far as my experience goes,” says, Mr. Carmichael,† “buboes are more infrequent in this form of the venereal disease than in any other. Before ulceration, they do not exhibit any peculiar characters, but afterwards, they partake of the general malignity of the disease.”

It is only necessary once more to add, that every venereal sore, however originally mild in its nature, may become pha-

\* P. 171.

† P. 217.



gedenic. Indeed, the virulent character of this ulcer, often does not show itself until after some weeks, and Mr. Carmichael gives one case in which the interval extended from August till the following February, or for five months. Mr. Skey and Mr. Guthrie have, also, frequently seen sores become phagedenic during their progress.

The sloughing form of *venerola phagedenica* has many degrees of intensity, varying from a simple sloughing sore to the "black lion" or "black pox;" or, in other words, to gangrene and mortification. The sloughing phagedenic ulcer may, as in the former species, be either a primary form of syphilis or an accident supervening on every form of primary sore.

The primary phagedenic sloughing ulcer is extremely rare; Mr. Carmichael gives one case of this description, in a gentleman, who, the day after connection, observed a dark spot, not larger than a pea, on a tender cicatrix on the prepuce. This disease continued to extend, accompanied with swelling and inflammation, and lasted from the 8th of August till the 17th of October, and terminated with the loss of a considerable portion of the glands and prepuce. Mr. Lawrence, also, gives the case of a woman, twenty-five years of age, admitted into St. Bartholomew's Hospital, for some feverish disturbance, and who was examined on the 10th of June for an uneasiness in the external organs of generation, when a discharge from the vagina was discovered, moderate in amount, without redness or excoriation of the external parts; and on the 12th, complaining of severe pain in the buttocks, "there was found in the fissure of the nates, behind the anus, "a large deep excavation with black sloughing surface, from "which there was an abundant discharge of a thin and extremely foetid ichor." In another case, a girl of eighteen years of age, the sloughing phagedena appears to have commenced on a hard swelling at the lower part of the left nympha. This description of case "is almost confined to "females, who are much more exposed than the other sex, to "the exciting causes."\*

\* Medical Gazette, 1838, p. 328.

The sloughing phagedenic or gangrenous ulcer, is less frequently, however, a primary form of syphilis, than an accident arising during the progress of a common venereal sore, and its attacks, generally, though not exclusively, fall on sores within the prepuce, whether of the glands, corona or inner lining of the prepuce. “This important “change,” says Mr. Skey, “is usually ushered in with “slight fever and its concomitants, during which, the sore “becomes discoloured, assuming a livid red colour, secreting “a dark brown fluid, which discolours the dressing. The “prepuce first becomes œdematous, and is withdrawn with “difficulty, and then inflames, participating in the change “which is progressing within. Phymosis follows, with advancing fever and great local pain, increasing the general “symptoms. Immense quantities of a sero-purulent fluid “escape from the prepuce, attended with extreme local suffering. Pressure on the glands may generally detect a rapid “extension of the sore in the circle of the fossa glandis. The “structure of which is broken down into flocculent and foetid “sloughs, which escape with the discharge. The foetor is “eminently characteristic of this condition, and may be perceived at a considerable distance from the bed. The “whole penis sympathises—inflamed absorbents along the “dorsum penis are indicated by a rigid line extending to the “pubis, which is eminently painful on pressure, and aggravated by the dependent position of the organ.”\*

In other cases, the sloughing phagedenic ulcer often excites so little uneasiness at first, that its attack is unobserved, even by the patient, until it has existed for several days. Mr. Lawrence gives a case of this kind in which a small sore behind the glands was entirely neglected for four days, till the penis was swelled to the size of the fore arm. In this case, the glands separated from the corpora cavernosa penis, but again became fixed to the body of the penis. In these extreme ulcerations, a considerable portion of the penis may be engaged before a line of separation can be observed between the living and the mortified parts. When the separation

\* Medical Gazette, 1839, p. 267.



at length takes place, we do not always find a clean granulating sore as after simple mortification, but a corroding phagedenic ulcer, which begins a new kind of depredation on the surrounding parts, equalling the virulence, but not the rapidity of the sloughing process; and in this way, this destructive malady continues to extend its ravages by alternately sloughing and ulcerating, until in one sex, the entire penis, scrotum, perineum and pubis are destroyed, and in the other, the labia nymphae, vagina, anus, nates, and, “I believe,” says Mr. Carmichael,\* “even the bladder and uterus are “engaged in one extended and malignant state of putrefaction.” The phagedenic sloughing sore, is, however, by no means common, and one of the causes of trifling sores proceeding to mortification, is the occurrence of phymosis, and the reciprocal pressure which the prepuce and glands, when inflamed, make on each other. In other cases, however, it is evidently the result of constitutional predisposition, or debility.

In general, the *seat* of the primary ulcer, when affecting the parts of generation in the male is the fossa, frœnum, glands, body of the penis, the prepuce, and scrotum. In women, the labia and nymphae, and, most commonly, their inner surface are the parts most frequently attacked, and, occasionally the perineum, and still more rarely, the vagina. The following table,† however, is an approximation to the relative frequency with which these different parts are attacked.

IN THE MALE.		IN THE FEMALE.	
Fossa between the glands and prepuce . . . .	269	Fossa navicularis, or posterior commissure, and between this commissure and the vagina or fourchette . . . .	41
Orifice of the prepuce . . . .	154	Internal surface of the nymphae or petites lèvres . . . .	37
Frœnum . . . . .	132	Meatus urinarius . . . . .	12
Internal surface of the prepuce . . . .	127	Labia externa . . . . .	6
Surface of the glans . . . . .	49	Carunculæ myrtiformes . . . .	5
Outer surface of the prepuce . . . .	45	External surface of the nymphae, or des petites lèvres . .	3
Body of the penis . . . . .	41		
Orifice of the urethra‡ . . . . .	11		
Scrotum . . . . .	5		
	<hr/> 833		<hr/> 104

\* P. 168.

† Boyer, *Traité Pratique de la Syphilis*, 1836, p. 78-87.

‡ The occasional existence of ulcers of the urethra is admitted by Ricord.

The *form* of the primary ulcer is more or less round, and those that are elongated, often become so\* from many chancres running into each other. Desruelles affirms† that venereal ulcers almost always become round during a mercurial course, while under a simple antiphlogistic treatment, the round ulcer often becomes elliptical, but, in no instance, does the elliptical become circular.

The *number* of primary ulcers is extremely variable, sometimes there is only one, frequently a plurality, as four, five, or six, and Boyer counted in one person, sixteen, and in another twenty-four, on the glands and penis. In general, they are more numerous in women than in men, the surface on which they usually form being more extensive. When there is a plurality of ulcers they are often of very different characters, some presenting the Hunterian indurated base, while others are free from all hardness.

The *size* of the ulcer offers many varieties. In general, it is in the inverse ratio of the number, but this is not constant. The glands has often not more than one chancre which generally, does not exceed the superficies of a sixpence, but, occasionally, it has extended from the orifice of the urethra to the insertion of the prepuce. On the internal surface of the prepuce they are always large—those of the orifice generally, round and small, while those of the external surface of the prepuce, of the body of the penis and on the scrotum, are usually large. Boyer speaks of having seen them of the size of half a crown.

The *duration* of the primary sore is very various, sometimes an ulcer which gives rise to secondary symptoms will

and by Cullerier. Ulcers of the urethra are characterised by the symptoms of gonorrhœa, except the discharge is much less copious, by indurations of the urethra, which may easily be felt externally, and occasionally by the formation of small abscesses opposite the indurated portion of the canal. The chancre of the urethra is generally situated at its orifice, or in the fossa navicularis, in these situations it may generally be seen. In other instances, it is placed lower down, and then the diagnosis becomes difficult and embarrassing.

\* Boyer p. 73.

† P. 484.



heal in a few hours, or a few days, while Ricord has inoculated from others which have lasted eighteen months.\* In general, the ulcers on the glands, fossa and internal surface of the penis, as well as those on the skin are easily healed. On the contrary, those of the frænum, and on the orifice of the prepuce yield with great difficulty, owing, perhaps, to the flowing of the urine over the one, and the mechanical tension caused by the slightest action of the penis in the other.

The *cicatrization* of primary ulcers offers some differences, when they are superficial, they often heal and leave no trace; but in all cases in which they form adhesions, an indelible and visible cicatrix is the consequence. The Hunterian chancre, also, leaves a deep cicatrix, but without any contraction or diminution of the surrounding parts.†

Such is a general account of the different classes of primary ulcers, and also of their seat, form, number, size, duration and mode of cicatrization. From their many different characters, it has been imagined they must result from a plurality of syphilitic poisons. Mr. Hunter first suggested this doctrine, and Mr. Abernethy, carrying out this view, derived them from a two-fold source, or from a syphilitic and a pseudo-syphilitic poison. The most ingenious and attractive theory, however, is that of Mr. Carmichael, who conceives there are four different syphilitic poisons; giving rise to four different forms of primary ulcer, each of which is succeeded by its own train of constitutional symptoms.

The theory of a plurality of syphilitic poisons, however, has not been established; for, repeated observation has shown, that a given primary sore has produced in the same, and in different individuals, every variety of primary affection, a superficial sore, for example, has often occasioned a phagedenic ulcer, followed by gangrene, while a deep Hunterian chancre has often been followed by a superficial excoriation. There are endless exceptions, also, to a given series of secondary symptoms, occurring after a given primary ulcer. The Army Medical Board, has distinctly stated

\* P. 137.

† Boyer, p. 83.

in their official circular, that no particular secondary symptoms could be traced to a particular primary sore; and Dr. Hennen, also, in testing this doctrine, found that of sixteen cases of Hunterian ulcer, followed by secondary symptoms—in six the cutaneous eruption was tubercular, in five exanthematous, in two pustular, while in one case the eruption was duplex, or both tubercular and scaly, and in another, tubercular and vesicular. Indeed, it is by no means unusual to see two and even three dissimilar eruptions, co-existing in the same party, and the consequence of one infection. This highly interesting theory, therefore, is not proved, neither is it necessary to explain the phenomena of syphilis, for the local diseases caused by many other poisons are equally irregular and anormal. Small-pox matter, for instance, taken from the same pustule, has, in different persons, produced the distinct, the confluent and the horn-pock; the crystalline, the bullous, the black and the bloody pock. The virus, also, taken from the dead subject, has produced a mild form of small-pox—while that taken from a mild sort in the living person, has often destroyed the patient. In the practice of vaccination, also, matter taken from the same source, produces, frequently, such a variety of vesicles, that we are often at a loss to determine whether the party will or will not be exempted from the small-pox. Even the forms of psora are not uniform, for there are no less than three different kinds of that disease proceeding from the same poison. It appears, therefore, altogether unnecessary to assume a plurality of poisons, to explain the varying phenomena of syphilis; still it must be admitted as highly probable, that a state of constitution which induces a given primary sore may commonly induce a given train of secondary symptoms, thus dividing this extensive group into a few different families—the exceptions being caused by changes which have subsequently taken place in the health of the party affected.

Primary ulcers often occasion the concomitant circumstances of phymosis, paraphymosis and bubo. The proportionate frequency of these occurrences is, probably, less in the army than among the civil population, who are unable to obtain the same immediate medical advice, or to place them-



selves at once under circumstances so favourable to recovery. The army returns, however, are the best data we possess, but they give the number of persons attacked with bubo, phymosis and paraphymosis while labouring under gonorrhœa and syphilis *en masse*. Taking, however, both these classes of disease, the proportionate numbers are as follows :

NUMBER OF THE TROOPS ATTACKED WITH PHYMOSIS, PARAPHYMOSIS, AND BUBO, WHILE LABOURING UNDER GONORRHŒA AND SYPHILIS.

Stations.	Numbers at- tacked with Primary Sore and Gonorrhœa	Phymosis and Para- phymosis.	Bubo.
Dragoon guards and Dragoons serving in the United Kingdom . . . . .	6008	27	884
Gibraltar. . . . .	1996	14	259
Malta . . . . .	5673	15	799
Ionian Islands . . . . .	3240	34	664
Bermudas . . . . .	271	6	41
Nova Scotia and New Brunswick . . .	2751	23	298
Canada . . . . .	4752	12	591
Windward and Leeward command . . .	1683	„	267
Jamaica command . . . . .	604	„	130
Bahamas . . . . .	23	„	„
Honduras . . . . .	8	„	1
	27,009	131	3934

Thus giving a ratio of one to two hundred and six suffering from phymosis and paraphymosis, and the larger ratio of one in seven nearly from bubo. The officers appear to suffer in a less proportion than the men, only one case of paraphymosis occurring out of 1128 attacked; while the numbers affected with bubo are only as one to eleven and a half.

*Phymosis*, is that state of parts in which the orifice of the prepuce is so contracted that it cannot be drawn backwards and the glands denuded. It is usually caused by chancres on the prepuce or on the glands, which cause an intumescence, either of the glands, the prepuce, or both. We find it occur in gonorrhœa spuria by tumefaction of the glands alone, and, on the contrary, it has occasionally resulted from an ulcer on the skin of the prepuce, the glands being unaffected.

There are two sorts of phymosis, or the inflammatory and the indolent. The former is the most common, and is, in

general, owing to painful chancres. If these are situated on the prepuce, that part becomes swollen, red and very painful, while the glands preserve nearly its ordinary volume and colour. On the contrary, when they are situated on the glands, which is rare—the prepuce, though dilated, is, for the most part, in its natural state, the glands being strangled by its own increase of size. Occasionally, the phymosis is caused by chancres, seated both on the glands and prepuce, or in the fossa, and, in this case, the portion of the prepuce in contact with the ulcers may be inflamed and thickened, while the other portion may yet be healthy, so that the phymosis is partial. In general, in the inflammatory forms, the glands become of a deep red, like lees of wine, and is swollen to double or triple its natural volume. The chancres with which it may be affected, also become enlarged, irritable and saignant, because the constriction in the fossa prevents the return of the blood, which the deeper seated arteries are constantly propelling into the part. If the constriction be not removed, phlyctenæ form, or the penis becomes fissured at the line of constriction, and some gangrenous points are seen. If the constriction be not relieved, retention of urine and mortification may ensue; but when the constriction is relieved, the inflammatory symptoms subside, and the chancres pursue their ordinary course.

Phymosis is sometimes indolent, the prepuce being hard and shining, but without any change of colour. Another form is when the phymosis is caused by œdema of the prepuce, fluid being effused into the preputial cellular tissue. In these cases, the parts are sometimes enormously swollen, œdematous, soft, semi-transparent and crystalline, giving to the penis a spiral form. This latter form has been termed crystalline phymosis.

*Paraphymosis*—Is, when the glands being exposed, the prepuce is so constricted, that it cannot be brought forward so as to cover the glands.

This form of disease is most common to persons having a naturally contracted orifice of the prepuce, and is almost unknown among those who have been circumcised. It is



more grave than phymosis, for it intercepts the circulation through the glands and a portion of the verge. There are, likewise, two kinds of paraphymosis, or the inflammatory and the indolent. Either of these accidents, however, are rare, for it is calculated there are ten cases of phymosis to one of paraphymosis, or not more than one in 2,000 cases of syphilis.

*Bubo*.—Is an enlargement of the lymphatic glands, usually of the groin, but, occasionally, of the neck and under the jaw in children who have been infected from suckling a woman diseased in the mammæ, and also of the arm-pit from chancre on the finger or upper extremity. Pathologists distinguish three kinds of bubo in syphilis; the first consists of a simple enlargement of the inguinal glands, and this is termed the glandular bubo. The second variety consists of inflammation, both of the glands and of the surrounding cellular tissue nearly in equal proportions, and this is the common bubo. The third kind is when the inflammation of the cellular tissue greatly predominates over that of the glandular structure, and this is the cellular bubo of most writers.

The glandular bubo is a simple enlargement of the glands of the part affected, and as there is no engorgement of the cellular tissue, they are often so small as to require an attentive examination to discern them. This bubo often forms without pain—but occasionally it is extremely painful—remains a long time stationary, and is rarely completely resolved.

The second kind of bubo commences ordinarily by the enlargement of one or more ganglia, and is sometimes, though rarely, indolent. More generally, at the end of some days, the tumor becomes painful, hot, red, tense and swollen, when suppuration soon follows. Sometimes, however, pus forms without any discoloration of the skin; and in this description of bubo, the tumor can often be felt formed on a hard base. The pus formed may be absorbed, but more commonly the skin becomes thin, bursts, and the pus escapes. The pus which first flows, is that usually termed laudable, and is furnished by the cellular tissue, but, afterwards, it is serous and secreted by the glands. The wound may readily

heal, but if the suppuration lasts long, the glands are destroyed. The duration of this bubo is usually a few weeks and the general and local symptoms are in proportion to the degree in which the cellular tissue participates in the inflammation.

In the third kind, the bubo begins as in the former, by enlargement of one or more of the glands, but the inflammation is quickly propagated to the cellular tissue, and usually an extensive abscess forms. The glands are always destroyed, or else so confounded with the cellular tissue, that, on healing, they form a hard schirrous mass, occupying the whole of the inguinal region. Examined after death, this mass is sometimes found an inch in thickness, and, under these circumstances, it is termed schirrous bubo.

A termination by gangrene is never observed in the first kind, rarely in the second, but it often happens in the third. In a few cases, the ganglia are, themselves, gangrened; and again, they are sometimes seen to preserve their vitality amidst the surrounding destruction.

The bubo may be either single or double. When single, its seat is not constantly on the same side with the ulcer. It is always seated in the superficial, and never in the deep-seated ganglia below the fascia, or only in a very few instances, in consequence of an extension of the inflammation. It is rare to find the ganglia below the bend of the thigh affected.

The bubo ordinarily manifests itself a few days after the appearance of the primary disease, and in a smaller number of cases, when the ulcer is beginning to granulate. Sometimes they have appeared simultaneously with it—have been known to precede it, and sometimes they have formed so late, that it is difficult to connect them with the primary sore.

The duration of the bubo is very various. The first kind never disappears. The duration of the second and third kind is usually from four to eight weeks, unless gangrene takes place, when it may last much longer.

It is a question much debated, whether bubo is a result



of sympathy or of an absorption of the poison. The facts, however, incline towards the latter hypothesis, for there is no proportion whatever between the intensity of the symptoms attending the primary sore, and the occurrence of the bubo. It is even affirmed that ninety-five in a hundred buboes follow chancres, unattended with pain or any notable inflammation, and in themselves, apparently incapable of accounting for any affection of the glandular structure, much less for the large and painful tumours which sometimes follow. On the contrary, irritable and painful chancres are often unaccompanied by bubo, or else of so little importance that they seem to be in the inverse ratio of the apparently exciting cause. It seems, therefore, that the inguinal affection is owing rather to an absorption of the poison than to any direct sympathy with the part primarily affected. It has been thought, also, that bubo was a necessary preliminary to the secondary symptoms; but there are so many exceptions to this hypothesis, that it is no longer generally entertained.

#### SECONDARY SYPHILIS.

The secondary affections of the syphilitic poison embrace a greater variety of disease than results, from the action of any other morbid poison; as, inflammation of the skin, the throat, the nose, of the bones, cartilages and ligaments, also of the eye; and lastly, the formation of many adventitious warty growths.

The secondary symptoms do not necessarily run through the whole series that has been described—for the ravages of the poison are often limited to one or two tissues. But in many cases they do, and then the order of their occurrence is very variable. Sometimes they attack seriatim, but more commonly two or more co-exist. Examples are not unfrequent of two tissues being affected simultaneously, as those of the skin and throat, and even of three tissues, as the skin, throat and periosteum; and even four tissues have been seen suffering at the same time, as those of the periosteum, throat, skin and ligaments. In whatever numbers they may exist, the order of their appearance is extremely capricious,

and according to no certain and definite law. In one individual, the affection of the skin precedes that of the bones. In another, the affection of the bones will take precedence of the eruption on the skin; and the same irregularity and inverted order is common to all the other affections. Most commonly, however, the affection of the skin is the earliest, while that of the eye and of the ligaments, is the last in the series.

It has been stated as the opinion of some pathologists, that the nature of the primary sore influences the nature as well as the number of the secondary symptoms; and if the nature of the sore be taken as an indication of the constitution of the patient, we can readily understand that the secondary symptoms of syphilis may often form themselves into groups; and it is but due to Mr. Carmichael to mention the order in which he has seen them most frequently occur. This gentleman states: \*—"From an attentive consideration of a vast number of cases, during many years, I find strong grounds for concluding:—

"*First.*—That the syphilitic chancre is attended by scaly eruptions, lepra and psoriasis, excavated ulcer of the tonsils, and pains and nodes of the bones.

"*Second.*—That the simple ulcer, (without induration, raised edges or phagedenic surface) gonorrhœa virulenta and excoriation of the glands and prepuce, are followed by a papular eruption, which ends in desquamation, pains in the joints resembling those of rheumatism, soreness of the fauces, and, frequently, swelling of the lymphatic glands of the neck, but that in a vast number, not a single instance was observed in which nodes were an attendant upon this eruption."† He adds, "if the eruption has been repelled by imprudent exposure to cold, inflammation of the eye is a very common attendant.

"*Third.*—That the ulcer, with elevated edges, in the few instances in which I had an opportunity of tracing it to its constitutional symptoms, were followed by a pustular

\* P. 53.

† P. 95.



“ eruption, which terminated in mild ulcers, pains in the  
“ joints, and ulcers in the throat, but no appearance of  
“ nodes ; yet the instances in which I had an opportunity  
“ of witnessing distinctly the connection between the pri-  
“ mary and secondary symptoms of this poison, were too few  
“ to form a decided conclusion with respect to this particular.

“ *Fourth.*—That the phagedenic and sloughing ulcers are  
“ generally attended by constitutional symptoms of peculiar  
“ obstinacy and malignancy, viz : pustular spots and tu-  
“ bercles, which formed ulcers, which spread, in general,  
“ with a phagedenic edge, and heal from the centre, exten-  
“ sive ulceration of the fauces, particularly of the back of  
“ the pharynx, obstinate pains of the knees and other joints,  
“ while nodes are frequently present, and the bones of the  
“ nose are occasionally affected.”

This sketch of Mr. Carmichael's, it must be admitted, is often not borne out by the facts, but still less so is the opinion of many other pathologists, who have thought, that chancres with a hardened base, and, more or less, partaking of the Hunterian sore, were alone followed by secondary symptoms. Since most practitioners must have observed, that the most superficial sores, the slightest ulcerations or excoriations, have been often followed, and quickly so, by secondary symptoms. The presence or absence of the Hunterian induration, is merely a measure of the idiosyncrasy of the patient, and of the reaction of his system, and is hardly alike in any two individuals.

The class of secondary symptoms, it has been stated, is altogether non-contagious ; but being exceedingly more numerous, more painful, more disgusting, and much more dangerous than the primary affection, they constitute the most important part of the study of syphilis, for often some of the diseases of the skin, of the bones, and of the throat, have terminated in death. The affections also of the nose, and of the hard and soft palate, have frequently ended in deformity of the face and change of the voice ; the affections of the joints, in lameness ; and of the eye, in destruction of vision.

The duration of the secondary symptoms, likewise, though greatly influenced by the treatment, is often extremely long, and supposing the patient to be predisposed to the entire series, and each disease to occur seriatim, and to be injudiciously treated, each may last many months—so that, including the intervals and occasional relapses, the patient is, sometimes, more or less affected for many years of his life. Each variety of this disease, therefore, well deserves the attentive consideration both of the pathologist, the surgeon, and of the physician.

*Cutaneous affections.*—Of all the secondary symptoms, the affections of the skin embrace the greatest variety of disease, and of so proteiform a character, that there is scarcely any genus or species of chronic eruption, which they do not occasionally simulate. Nevertheless, there are certain specific differences, which distinguish them from ordinary diseases, as the shade of colour, and the tendency to ulceration. The syphilitic eruptions, for instance, are of a deeper red, or yellowish brown, “more copper-coloured” than the diseases they resemble. They have, also, a tendency, on subsiding to stain the natural pigment of the part affected with a dusky, hepatic spot, of the same size and form as the original eruption, a discoloration, which often long continues to disfigure the patient. Another peculiarity, also, which distinguishes the syphilitic from the ordinary forms of cutaneous disease, is their greater tendency to run into chronic ulceration. It is, also, a characteristic of syphilis, that two or three dissimilar eruptions may co-exist in the same patient, and, likewise, that they are seldom accompanied by pruritus or itching.

The syphilitic cutaneous eruptions, admit of being classed under the orders, papulæ, squamæ, exanthemata, pustulæ, vesiculæ, tubercula, and maculæ of Willan.

*Papulæ syphiliticæ.*—The most usual forms of venereal papulæ, are lichen; some forms of prurigo and scabies.

The genus, *Lichen*, offers two species, or the lichen syphiliticus, and the lichen syphiliticus agrius.

The *lichen syphiliticus*, is an eruption, consisting of a



number of small, firm and solid elevations or papulæ of the skin, which inflame and desquamate, leaving the inflamed part covered with a scurf, and among them, papulæ with acuminate tips, containing pus or lymph, may occasionally be seen. The disease having become stationary, varies from a pale red to a deep crimson, while the exfoliation of the cuticle, gives it an appearance of scaliness. On declining, each lichenous spot leaves a brown or copper-coloured stain, of the same size as the original affection, and which frequently lasts a considerable time before it disappears.

The time of the appearance of this eruption after infection, is extremely uncertain. In a few cases, Mr. Carmichael says,\* he has observed it to occur in four or five weeks after infection. Its duration is extremely capricious; sometimes it will decline in a few days, or it may last many weeks, or even many months.

This variety is frequently ushered in by a smart attack of fever, and the fever does not always subside on the appearance of the eruption, but exists as long as fresh crops continue to appear, and is usually accompanied with pains of the joints, which are most severe at night. The papulæ, in some patients, are very numerous on every part, but particularly on the face, also on the alæ of the nose, and the commissure of the lips, as also on the back, abdomen and arms. This form seldom ulcerates, and is not accompanied by pruritus.

The syphilitic is distinguished from the ordinary forms of lichen by the papulæ being more numerous and more confluent, and by their running more frequently into small oval clusters, whose greatest diameter may equal that of a shilling, and even larger, also by their being separated from each other by interspaces, covered with distinct papulæ.

The *lichen syphiliticus agrius* differs from the preceding variety, in the eruption appearing without fever—in its being of a brighter red or copper-colour, and by discharging a thin fluid, which concretes into a scab; so that should the

\* P. 90.

disease be neglected, the clusters have a tendency to ulcerate. The diseased papulæ are generally arranged in larger patches than the former, sometimes exceeding two inches in diameter.

Either form of lichen is exceedingly common, but the lichen agrius is the least frequent. They often co-exist with most of the syphilitic eruptions, as well as with many other of the secondary symptoms, as affections of the bones, of the eye, or of the throat.

The *Prurigo syphilitica* is a less frequent form of cutaneous eruption than the lichen syphiliticus. It attacks, principally, the pudenda of both sexes, often spreads to the thighs, and discharges an acrimonious matter, which inflames, thickens, and excoriates the parts over which it flows, or if it occurs in the folds of the limbs, the parts with which it is in contact.

The *Scabies syphilitica* is the third form of papular eruption, and greatly resembles the ordinary forms of scabies papuliformis, but is in no degree vesicular, neither is it accompanied by pruritus. It principally attacks the arms, thighs and trunk of the body, and may co-exist with every form of secondary syphilis.

*Squamæ syphiliticæ*.—The squamous forms of syphilis, are lepra syphilitica and psoriasis syphilitica.

Dr. Willan's description of *Lepra syphilitica* is so constantly quoted, that there can be no doubt of its general correctness; it is as follows: \*—"In the venereal disease, circular patches sometimes appear, which resemble those of the lepra nigricans in size and colour, but which are not encrusted. The dryness and harshness of the skin, so remarkable in the lepra vulgaris and alphoides, do not occur in the venereal lepra, its patches, when somewhat advanced, being as soft and pliable as other parts of the skin. It is, however, proper to observe, that every patch originates from a small, hard, reddish protuberance. As this gradually dilates, the increase of its circumference is not attended with an increasing elevation of the centre;



“ on the contrary, the edges of the patches are somewhat  
 “ raised, and the central part of it appears a flat surface,  
 “ covered with thin white scales. The patches are gene-  
 “ rally distinct, and at a distance from each other. There  
 “ is seldom seen any of them exceeding the size of a shil-  
 “ ling ; yet, it is probable, they might acquire a greater mag-  
 “ nitude, if the progress of the disease were not arrested by  
 “ the use of mercury. When the constitution is under the  
 “ full influence of mercury, the edges of the patch shrink and  
 “ become paler, the centre is also depressed, but the desqua-  
 “ mation proceeds slowly, and the disease cannot be removed  
 “ without a perseverance in the course for six or eight weeks.  
 “ A circular red spot usually appears, for some time, in the  
 “ place of every declining patch, and a minute shallow de-  
 “ pression, like a cicatrix, is left at the centre, but no per-  
 “ manent discoloration of the skin remains, as in some  
 “ cases. The leprous form of the syphilitic eruption, takes  
 “ place like other venereal eruptions, at very different  
 “ periods after infection, in different cases. If no medicines  
 “ were employed, it would at length terminate in venereal  
 “ blotches.”

This eruption may be generally diffused over the body, or it may be limited to one or more parts, as the scalp, neck, shoulders, or to the thighs, legs and arms. When it forms in the gluteal fissure, on the scrotum, or any other part where two surfaces are in contact, the cuticle, instead of desquamating, is smooth, of a dull white or grey colour, and covered with an unctuous matter.

There are three kinds of psoriasis syphilitica, or the psoriasis syphilitica diffusa, the psoriasis syphilitica palmaris vel plantaris, and the psoriasis syphilitica guttata.

The *psoriasis syphilitica diffusa* scarcely differs from the ordinary forms of this eruption, except in being something deeper in colour. Its most usual seat is the posterior portion of the fore-arm, or the anterior portion of the leg or knee ; but it may attack many other parts, as the forehead, breast, back of the neck, or pubis. It not unfrequently accompanies periostitis of the tibia or ulna.

The *psoriasis syphilitica palmaris vel plantaris* is described by Rayer in the following terms:—"In the palms of the hands and soles of the feet, syphilitic psoriasis is almost always distinct. It makes its appearance by a number of spots, from three to four lines in diameter, but little or not at all prominent, and of a yellowish colour, very similar to that of the thick, horny indurations of the cuticle, often seen in the palms of the hands. If, at this period of the disease, a portion of the whole of the epidermis be removed, a thin layer, of a yellowish substance, will frequently be found deposited between the surface of the cutis and detached cuticle. Small lamellar scales are very regularly thrown off from the palmar surface of the hand and sole of the foot, which almost always presents a mixture of yellow, of red, of violet, and of copper-coloured spots, or blotches, surrounded by an epidermic rim. The spots of syphilitic psoriasis are occasionally arranged in the form of a large ring in the palm of the hand; at other times, they present the appearance of a kind of arc of a circle, something like psoriasis gyrata."

When this eruption affects a part which is opposed by another skin, as between the fingers or toes, or as in *psoriasis syphilitica diffusa*, between the nates, or between the scrotum and the thigh, or under the arms, or between the thighs, it is not scaly, but the skin is elevated into a soft, flat, or convex surface, which is at first moist and whitish, then excoriated and red, and, at length, cracks into rhagades or fissures. That part of the fingers and toes upon which the nail is placed, is often attacked, when a separation of the nail follows, similar to the desquamation of the cuticle in the eruption of the skin. Mr. Hunter, however, observes there cannot be here that regular succession of nails as of cuticles; and this affection is termed syphilitic onychia.

"If mercury be not employed," says Mr. Carmichael,\* "the eruption proceeds to ulceration in the following man-



“ ner. Each spot is covered with scales, or by scurf, which  
 “ is thrown off and succeeded by another, every succeeding  
 “ scurf which is formed, becomes thicker than the preceding,  
 “ till, at length, it forms a crust, under which, matter collects,  
 “ and it becomes a true ulcer, in which state it spreads very  
 “ slowly.”

The *psoriasis syphilitica guttata* may appear, partially or generally, on every part of the body, but it is principally on the extremities and on the scalp that it is most frequently seen. It appears in irregular round patches, of two to four lines in diameter, more elevated at the centre than at the circumference, of a reddish colour, covered with one or more scales, which are readily detached, and on falling off, leave a hard, dry, polished surface. Biett observes, it is always surrounded by a whitish edge, similar to that which marks the disc of a vesicle ; but this is not constant. The syphilitic squamous eruptions, when occurring in the axillæ, the inner part of the thighs, on the scrotum, the labia majora, margin of the anus, or the commissures of the lips, assume the appearance of spots or patches, which have many of the characters of flattened tubercles, a consequence, perhaps, of difference of texture and of local situation.

The *psoriasis preputialis*, appears in the form of deep chaps or cracks around the margin of the prepuce, which, as is the case when the same disease affects the lip, are extremely irritable, and apt to bleed whenever any attempt is made at retraction, but which, from the loose, cellular texture of the prepuce, are, in this case, generally much deeper ; the discharge is of a glutinous nature until the morbid action diminishes, when it becomes purulent, and then the healing progress begins, which is often very tedious. This disease is apt to give rise to bubo.\*

When the *psoriasis syphilitica guttata* begins to heal, and the tumefaction to subside to the level of the skin, and the scales have fallen off, it is very easy† to confound it with the cicatrices of the small-pox, for, instead of a reddish grey, it

\* Evans, p. 31.

† Boyer, p. 132.

turns brown. It may be distinguished, however, from the small-pox, by its surface being slightly salliant, or, at least, plain instead of being depressed.

*Exanthemata Syphilitica*.—The species of this genus, though very numerous, when they arise from ordinary causes, yet in syphilis, are chiefly limited to four kinds, or to the roseola syphilitica febrilis, the roseola syphilitica annularis, the roseola syphilitica diffusa, and to the purpura syphilitica.

The *Roseola Syphilitica febrilis*, is an eruption which appears either on the face, chest, trunk, or extremities, and is not to be distinguished except by the previous history, from the roseola simplex of Willan. It is preceded and accompanied by a sharp febrile attack, lasts about a week, and then terminates by desquamation.

The *Roseola Syphilitica annularis*, consists of a number of patches of a dirty pink or copper colour, generally distinct, seldom more than half an inch in diameter, and very much resembling the eruption in measles. These patches, when minutely examined, appear to be formed by the aggregation of four or five slightly coloured points, or stigmata slightly prominent; and, as in measles, their colour is evanescent on pressure. They frequently cover nearly the whole of the body, but most principally affect the neck and scalp, the alæ of the nose, the commissures of the lips, and also the forehead. The arrangement of the patches on the forehead is sometimes peculiar, and forms one of the many corona veneris of this disease. This eruption is often tedious, most generally terminating by a slight desquamation; but, like all syphilitic eruptions, has a tendency to ulcerate. On dying off, it leaves a brown hepatic spot, that for many months, continues to mark the form and seat of the original disease.

The *Roseola Syphilitica diffusa*, is a diffuse inflammation of the skin, generally of considerable extent, and of a deep red colour. Its usual seat is the back and neck. This eruption frequently co-exists with tubercula syphilitica, and on dying away leaves no discoloration of the rete mucosum.

The syphilitic forms of purpura, are *purpura syphilitica*,



and *purpura syphilitica hæmorrhagica*. Their varieties are not dissimilar to the ordinary forms of purpura described by Bateman. The stigmata of the first variety are extremely minute, sometimes a mere point not exceeding the bite of a flea. In the second, however, they form large patches, sometimes as big as the palm of the hand. The arms, thighs, and trunk of the body, are the principal seats of these forms of disease, which not unfrequently precede the squamous and pustular forms of syphilis, and often accompany the papular and tubercular eruptions.

*Pustulæ syphiliticæ*.—The *ecthyma syphilitica* is the only known pustular form of syphilitic cutaneous disease.

The *Ecthyma syphilitica*, is an eruption of pustules, each about the size of a small-pox pustule, having a hard circular inflamed edge or base. The pustules are, therefore, phlyzacious. Each is surrounded by a copper-coloured areola, which discharges a sanious matter, that scabs, and, on healing, leaves a deep cup-like cicatrix, which is permanent. They form principally on the forehead, alæ of the nose and beard, and as they have a tendency to become confluent, often produce a most unsightly corona veneris. This disease is at all times chronic, and if neglected, is said to push forth fungoid vegetations.

Rayer has given a form of *ecthyma syphilitica*, in which the pustules are psudracious, and consists of minute pustules, irregularly circumscribed, slightly eminent, and forming a scab. He represents them as numerous; often confluent, and, on rupturing, as discharging a thin watery humour, which forms an irregular incrustation. A case of this rare kind was a short time ago in St. Thomas's Hospital, in which the eruption appeared first on the legs, where it left many large rupia-like sores, and subsequently a tolerably large crop appeared on the neck.

*Vesiculæ syphiliticæ*.—It is doubtful whether any form of this genus exists, except rupia, and herpes preputialis.

The *Rupia syphilitica*, consists of a number of dusky-brown tumours of considerable size, each of which is surmounted by a vesicle, which breaks, and discharges a clear transparent

glutinous fluid that concretes into a peculiar conoidal scab, resembling a limpet-shell, in consequence of each successive layer being larger than the former. Beneath this remarkable incrustation, however, a slow process of ulceration goes on, so that on the scab falling off, a wide spreading ulcer is often seen, sometimes superficial, but at others, deep and foul. In the latter case, they occasionally penetrate to the bones of the nose, the tibia, the ulna, the clavicle, or the cranium, causing ulceration, and caries of those parts. This ulcer heals from the edge, and when completely healed, the cuticle, according to Rayer,\* repeatedly desquamates, a result, however, by no means constant. On healing, the ulcer leaves a permanent cicatrix.

This disease usually appears on the thighs and legs, or on the arms, but it may form on every part of the body. The face is often its seat, as also every part of the nose, the eyebrow, and even the inner eye-lid. The number of these tumours is seldom great, often not more than two or three, and seldom exceeding twenty. In size, they generally vary from a small nut to that of a walnut. Their duration depends, in a great measure, on the treatment, for if left to themselves, they often continue open sores for many months.

The most remarkable circumstance connected with rupia, is the extreme depression of the constitution which accompanies it, for many strong, and even robust persons, become greatly worn and emaciated under its influence, and, in a degree, by no means to be accounted for by the extent of the ulceration. An unusually large and powerful man was lately admitted into St. Thomas's Hospital, with sore throat and a few rupia, but so reduced in flesh, as to be in a state of absolute emaciation, and so feeble in constitution, that his face was as purple as if labouring under cholera. His legs, also, were œdematous. A similar case was also admitted about the same time, the patient a mere

\* P. 801.



skeleton. Another patient, also, has lately died of it in St. Thomas's Hospital. All other forms of syphilis are consistent with a good general state of health, but this eruption denotes a feebleness of the constitution, which sometimes proves fatal. It usually co-exists with other secondary symptoms, as periostitis, or affection of the throat; but it is seldom, or, perhaps, never combined with iritis.

The *Herpes preputialis*, first appears as a cluster of vesicles, which scab, and this being removed, a number of small circular ulcers is seen, with a yellow or white surface, often running the one into the other, with an edge sometimes a little raised, and of which the healing process is sometimes tedious.

*Tubercula Syphilitica*.—The term tubercle, in dermatology, does not imply that peculiar substance, which, when deposited in the lungs, or other organ of the body, is usually designated by that name, but is defined to be a small, hard, superficial, isolated tumour, or elevation of the skin resembling a wart in character, ordinarily isolated, but sometimes confluent at their base, and whose natural course is to terminate in slow ulceration.

Of tubercular syphilis there are two varieties, or tubercula syphilitica rubra, and the tubercula syphilitica flava, and these may be either round or flat. The former consists of a number of copper-coloured elevations—the latter, of elevations of the same colour as the skin, which, in these cases, is usually thick and muddy. They may be either smooth or covered with squamæ, flat or prominent, dry or moist, scattered or clustered, and the cicatrices which form after ulceration, often remarkably disfigure the face or person.

The *tubercula syphilitica rubra rotunda* consist of a firm, solid, moveable tumour, of a conoidal form, and about the size of a split pea, red, not painful, nor the seat of pruritus. They usually appear in great numbers, sometimes on the face, but more commonly on the trunk of the body, and especially over the back and shoulders. This disease often assumes a pustular form, and sometimes, if neglected, ulcerates. Its duration is very various, and though it may

terminate in a few weeks, it usually lasts two, three, or four months, or longer.

The *tubercula syphilitica rubra plana* consists of a number of flat tubercles, having an equal thickness over their whole surface, except at the edge, where it is in more prominent relief by the thickness of a line or more. Their colour is of a livid red, and their size varies from a lentle to the palm of the hand. This variety has a great tendency to ulcerate, and then the edge thickens and rises, so that the tubercle generally appears depressed. The swollen surface becomes fissured, and secretes a faint, dirty white matter. These fissures sometimes increase to considerable ulcers, and, on healing, their cicatrices, at first resemble yellowish or violet coloured blotches, and do not acquire a natural colour or proper pliancy, until after a very long time. It is remarkable, also, to observe, as in cancer, these ulcers sometimes healing in one direction and spreading in another. They are attended with little or no pain, and with little inflammation beyond their edges, which are deeply and sharply cut. Sometimes, however, they assume a phagedenic character, so that when they attack the face, they do not present regular cicatrices as in the superficial ulcer, but unsightly bands, or rather seams, as after burns, or in the *lupus exedens*.

The duration of the flattened form is, at all times, exceedingly chronic, and, when ulcerated, the process of healing is extremely slow. Its principal seat is the pudendal region, as the labia majora, glands, or scrotum; sometimes they form round the anal aperture, and their fissures may then penetrate the rectum. More commonly, however, they form on the inner part of the thighs, the groin, and over the gluteal muscles, or on the trunk, occasionally, they are also seen on the face, lips and ears.

The *tubercula syphilitica flava, vel rotunda, vel plana*, does not differ from the red variety either in seat, form, duration, or termination, or in any other respect than in the tubercle preserving the colour of the skin. Sometimes, however, they do pass into the red state.

Among the tubercula, must be classed those many vege-



tations, excrescences, or warts, which are so frequent in syphilitic patients.

These vegetations are developed in two different manners, each influencing the form which they afterwards take. In the one, the vegetation appears under the form of a point, or of the size of the head of a large pin, and is most commonly white, but in some few cases it is red. If we pass the finger over it, we feel on the surface inequalities as in a strawberry, and, in proportion as it increases, it assumes the appearance of a red stalk, surmounted by a white head, and sometimes they spring up like so many heads of asparagus.\* In the other mode of development, a red spot is seen on the part affected, often visible by the naked eye, and always by the microscope, covered by a number of small white points, and the finger, passed over this spot, is sensible of many inequalities. In proportion as the vegetation shoots up, this structure is more apparent, and, at length, it becomes certain that it is only a multiplex form of the first kind. The vegetations thus developed may preserve their broad base, and each stalk spring from the skin parallel to its neighbour—or they radiate from one peduncle in the manner of a cauliflower, and in the one and the other case, they acquire a considerable volume.

Sometimes these growths, previously isolated, unite, and from this cause, we occasionally see them embrace the whole circumference of the glands. The forms of these vegetations are exceedingly capricious, and from their resemblances, they have been termed cauliflower excrescences, coxcombs, and a great variety of other familiar names. The size of these tumours varies from the head of a large pin to that of an orange, and Boyer speaks† of having seen one around the anus, which surpassed in volume the fist of the strongest man. In women, their magnitude is sometimes so considerable, when growing from the labia, that they obstruct the orifice of the vagina. Their number is exceedingly variable, sometimes from one to four, and occasionally, as many as fifteen or twenty. Their

\* Boyer, p. 127.

† P. 125.

growth is generally rapid, so much so, that in a woman who had four rows on the labia and bend of the thigh, and many on the mons veneris, the whole formed in two months and a half. When removed, in one case they returned five times in three weeks, and in another case a woman, sixteen or eighteen times in eight months. As long as the excrescences are small, they are commonly dry, but when large, they often discharge a fœtid, acrid matter, and sometimes bleed, or become fissured, giving excessive pain.

These vegetations often assume the humbler appearance of warts, and may arise from a small slender peduncle or stalk, or from a broad base, tapering to a point, but the forms of the verruca are endless.

This species also includes all those varieties which have been classed by authors under the names of rhagades, fici, condylomata, &c., &c. It also includes those hypertrophied and elongated labia, or nymphæ, which sometimes hang pendant for many inches. In general, they grow from those parts which are usually the seat of chancre, and which, in the opinion of some authors, have an intermediate structure between the skin and mucous membranes. Thus, we find them most commonly on the perineum, around the anus, on the penis, and in the folds of the thighs, but it is more especially in women that these growths are observed.

*Maculæ syphiliticæ.*—*Maculæ syphiliticæ* are partial discolorations of the skin, forming patches, which vary from a sixpence to the size of the open hand. They are either of a yellow or brown copper colour, and appear to depend on an alteration of the pigment of the rete mucosum. In general, the maculæ terminate without any sensible alteration of the structure of the skin. But in a case lately in St. Thomas's Hospital, these patches exhibited the remarkable phenomena of ulceration. In this patient, the face was thickly covered with roseola syphilitica annularis, while his arms and back were covered with maculæ, varying from a sixpence to a crown piece. Under the cuticle, however, a slow process of ulceration was going on, destroying the rete mucosum, as well as the substance of the cutis. The ulcer



thus formed, had a sharp edge, as though made by a punch, and was about two lines below the general surface of the skin in every part. It was covered by the cuticle, not detached, but puckered up, so as to lie loosely on it, and presented a most beautiful specimen of the dry ulceration of Mr. Hunter. The maculæ form principally on the trunk of the body, frequently covering a large space. They also appear on the face and extremities. The duration of this form of cutaneous eruption is always extremely long, and may last many months, or even years.

*Of the syphilitic diseases of the osseous system.*—Next to the dermoid tissue, the osseous system is the most frequent seat of the secondary actions of the syphilitic poison, and its diseases are the more important, as they are frequently of long continuance—often disfigure the patient, and are, in most instances, the cause of severe suffering. The principal syphilitic affections of this system, are, inflammation of the periosteum, and inflammation with enlargement, ulceration, abscess or necrosis of the bones themselves. It is remarkable, also, that these affections differ in many important circumstances, according as they occur in the long or in the flat bones.

The *hard periosteal node* of the long bones is caused by inflammation of the periosteum, which, probably, extends to the bone itself. The result of this inflammation, is thickening of that membrane, and the deposition of a hard membraniform substance on the surface of the bone, which, if recent, may be removed by maceration. This newly formed part may be absorbed, may ossify, or it may ulcerate.\* The specimens in the museum of St. Thomas's Hospital are all membraniform.

The termination by absorption is seldom observed, unless under a treatment by medicine, and is then extremely common. The termination, however, by ossification was for-

\* Desruelles, des Maladies Vénériennes, p. 635, says, in periostitis, he has often made an incision of many inches along the external surface of the tibia, and removed a thick white matter of the consistence of *cheese* from beneath the periosteum. The pain, he adds, has immediately ceased after the operation, and the wound, suppurating, has readily healed

merly frequent, and in this case, points of ossific matter were first deposited throughout the membranous substance of the node, which were gradually multiplied, till it became entirely converted into a bony, cancellous structure, of greater or less solidity, forming, at length, an integral part of the bone itself, whose diameter at the affected portion, was thus often greatly increased.

But, although the hard periosteal node, usually terminates by absorption of the membraniform substance, or by ossification, yet it may terminate in suppuration. Suppuration of the hard node of the long bones is, however, by no means common, and when it does take place, it may be superficial, or, more generally, the abscess is felt surrounded by the sharp edge of a deep, cup-like ulcer. The pus, thus formed, may be either absorbed, or make its way to the surface. In the latter case, the bone may be exposed, or so affected, that it may exfoliate.

The hard periosteal node, just described, does not attack all the bones equally. It probably never forms on the head, the phalanges of the fingers, the bones of the foot, on the vertebræ, or on the bones of the nose, palate, or face, but has its seat, perhaps, exclusively on the long bones of the leg and of the fore-arm. Neither does it attack all these parts with equal frequency, for the poison falls much more commonly on the tibia than on the fibula, and on the ulna than on the radius. The clavicle, also, though more rarely, is the seat of this affection. It is doubtful whether the femur or the os brachii is subjected to this form of node, although it seems proved they are occasionally the seat of syphilitic inflammation.

The hard periosteal node, on whatever bone it forms, is usually preceded by severe pains in the affected part, simulating rheumatism, and which last a greater or less length of time. A tumor then forms, hard, circumscribed, excessively painful, adherent to the bone, usually without any discoloration of the skin, but occasionally accompanied by slight, and, in some cases, extensive œdema and inflam-



mation of the whole of the diseased limb. As the tumor increases, the pain generally increases also, especially at night, and deprives the patient almost entirely of rest. In this conflict, the strongest constitution is often overpowered, and the most robust frame greatly emaciated, so that it is not unusual to find the stoutest men worn down with constant suffering, and earnestly entreating relief from medicine. When the tibiæ are affected, the centre of the shaft is the part most commonly diseased; then the lower third of the bone, and both tibiæ, are, perhaps, more constantly affected than one. When the ulna is the seat of the disease, it is the upper third on which the node more usually forms, and one ulna is more commonly affected than both. This form of disease appears at very different periods after infection, sometimes it occurs within a few weeks, but more usually, the patient states the interval to be two or three and even more years from the time of the primary sore. It is plain, therefore, the opinion generally entertained, that, unless the secondary symptoms appear within a few months, they will not appear at all, is greatly erroneous, and explains much of the difficulty which exists in estimating the frequency of their occurrence. This description of node shews little tendency to a spontaneous cure, and, according to the treatment, its duration varies from a few weeks to many years, and when the cure is imperfect, it has a great tendency to relapse. It is singular, that in severe cases, the leg, on the subsidence of the greatest violence of the pain, often becomes œdematous.

The second form of node is the *soft node*, which, from the nature of the secretion which accompanies it, has obtained the popular name of the "gummy node." This disease consists, equally with the former, of inflammation of the periosteum, and, according to Desruelles,\* of its external surface, as also of the intercellular tissue of the muscles and ligaments, terminating in the secretion of a fluid of the consistency of gum water, or of a thin jelly, or of a still greater firmness. This form of node is of so rare occurrence,

\* P. 636.

that it is doubtful whether it has been rightly attributed to a syphilitic origin, and in three out of four cases I have witnessed, it occurred in patients on whom no suspicion could rest. It is attended with less pain than the hard node, but, as it forms among the muscles, it sometimes presses on a nerve, so as to cause considerable loss of power, as well as numbness of the limb, or on a blood-vessel, and renders the leg or arm œdematous. It is usually indolent, but has a tendency, at last, to ulcerate, sometimes extensively and deeply, so that not only exfoliation, but death has followed. The tumor is generally moveable, and the skin, unless near bursting, of the natural colour. Its usual seat is the forearm, the leg and the head. This node is difficult of cure, and its duration, consequently, indefinite. Its fluid contents, also, require to be analysed.

The syphilitic poison may also cause *inflammation of the substance of the long bones*, terminating in enlargement, in ulceration, in abscess, in caries, or in necrosis. When the inflammation produces enlargement of the long bones, the attack is usually partial, and limited to a small portion, as the centre of the shaft. The part attacked is considerably augmented in size, exceedingly more dense, and, consequently, contains a great deal more ossific matter than in a state of health. When examined after death, the exterior of the bone presents an elliptical bony tumor or swelling, which when bisected, is found to encroach on the cancellous structure, and partially to obliterate it. The medullary matter is also redder, and of greater consistency than in health, and the periosteum is thickened. If the disease proceeds, superficial ulceration of the bone may take place, even without enlargement, or an abscess may form in the heart of the bone itself, when exfoliation must necessarily follow. The exfoliated portion is usually of a brilliant whiteness, which being detached, the pus escapes, the ulcer granulates, and the part generally heals.

Inflammation of the substance of the long bones may terminate in *caries*, or in *necrosis*. There are specimens in our museums, not only of the tibia and fibula, and of the



ulna and radius, but also of the os femoris, os brachii, of the ribs, and, indeed, of every bone of the body being necrosed and worm-eaten by this affection. Of the long bones, however, the metacarpal bones and the phalanges of the fingers are most commonly the seat of syphilitic caries and necrosis. These parts, when so diseased, often present externally the appearance of the hard periosteal node, but the appearance is deceptive, and produced merely by a thickening and infiltration of the soft parts. The inflammation of the bones is often so rapid, that unless checked by medicine, it often terminates in a few weeks in caries.

The cranial and facial bones, termed the "flat bones," as they differ in structure from the long bones, so do their affections in syphilis follow entirely different laws. When the syphilitic poison produces nodes on the cranium, we might be led to imagine, from the external appearance, and from the firmness and resistance of the node, that it was of exactly similar formation to that of the tibia and ulna, and that a membraniform substance, ossified or otherwise, was deposited on the bone. But, on a careful examination of many syphilitic crania, no such adventitious formation has been found, so that it is probable, that the hard immoveable external cranial tumor is caused by an infiltration of the soft parts, bound down by their peculiar aponeurosis. Even in those strangely worm-eaten skulls in which deposition and absorption, thickening and thinning, newly-formed parts, and immense voids, so singularly intermingle, there is no membraniform or ossified substance similar to that of the tibial node to be seen. The formation of the hard cranial node, appears, then, to be owing to an inflammation of the periosteum, causing a considerable deposition of a substance not yet determined, perhaps of lymph, which does not ossify, bound down by the aponeurosis. This node much more frequently ulcerates than the nodes of the long bones, and the abscess is readily detected by the fluctuation of a fluid surrounded by the sharp edge of an ulcer.

If the disease proceeds, the bone itself is affected, and ulceration and extensive exfoliation of the outer table often

takes place.\* It seldom happens, in this country, in the present day, that the disease proceeds beyond this point, but there are many specimens in every museum, which show most extensive ulceration of both tables, and render it probable that the death of the patient must have been caused either by exposure of the brain, or by an extension of the inflammation to its membranes. A portion of the cranial bones being destroyed, pathologists are not agreed in what manner the injury is repaired; but the more common opinion is, that the void is first covered over by the soft parts, and that afterwards a process of ossification commences, but so slowly, that an indefinitely long period elapses before the defective bone is replaced.

The hard node by no means so frequently occurs on the cranium as on the extremities, and when it does occur, it is almost uniformly found on the frontal and parietal bones. There are seldom more than one or two, but in a very few instances, they have been found in greater numbers. They sometimes attain the size of a small orange, are prone to suppuration, and if neglected are difficult of cure.†

The syphilitic poison may, also, fall on the bones of the face, and we have many specimens in which the ossa malorum and the bones of the orbit are extensively eroded from ulceration. But syphilis is now so early, and so completely checked by medicine, that any affection of these bones is extremely rare. I have met with two cases, however, in which the eye was thrust forward and immovably fixed in the socket, apparently from matter effused in the orbit, but their connection with syphilis was not strictly

\* A case of this kind was recently treated by me in St. Thomas's Hospital, in which a portion of the outer table of the skull, of the size of half a crown had been removed by syphilitic ulceration. The man recovered, but without restoration of the exfoliated part.

† Boyer speaks of exostosis of the internal table, and says, "Les exostoses de la face interne des os du crane, qui ont acquis un volume considérable peuvent occasionner des maladies graves par la pression qu'elles exercent sur la masse encéphalique. Elles varient en raison de la portion du cerveau qui est comprimée, c'est ordinairement du côté de l'orbite qu'on les observe, d'où résultent l'exophtalmie ou l'amaurose."



demonstrated. They were both, however, cured by the iodide of potassium.

The bones, however, of the nose and palate are still frequently found to be diseased. In these cases, the affection may begin by inflammation and ulceration of the mucous membrane, but more commonly, perhaps, in the bones themselves. The inflammation, in whatever manner set up, usually terminates in necrosis, sometimes so extensively, that the vomer, the ossa unguis, the turbinated bones, or a considerable portion of them exfoliate. The cartilages, as well as the bones of the nose, are also, frequently involved in the disease, so that the hard parts being thus withdrawn, the soft parts fall in and produce a permanent and most unsightly deformity. For example when the whole of the proper bones are destroyed, the soft, parts sink, and nothing but the mere tip of a nose is to be seen; while, if the necrosis be partial, a depression remains at the affected part, and supposing the skin to have been ulcerated, a cicatrix marks the spot. Boyer, however, has delighted to follow all the possible modes of disfigurement from this cause, and has depicted them as follows: \* “Si les os propres du nez sont nécrosés en entier, la  
“partie du nez qu’ils forment est affaissée et aplatie, et il ne  
“reste plus qu’un bout de nez. Si un seul os est nécrosé,  
“le nez n’est déformé que d’un côté—si la nécrose est par-  
“tielle, il y a un enfoncement sur le point détruit lorsque la  
“peau n’a pas été malade, une cicatrice adhérente à l’os se  
“fait à l’endroit correspondant.

“Lorsque la cloison des fosses nasales est attaquée, les

\* Boyer says, p. 182, “Les os malaïres, les apophyses montantes des os  
“maxillaires et la partie de ces os qui appartient à la paroi externe du sinus  
“maxillaire sont souvent affectés d’exostoses. Celles de l’os malaire et  
“de la paroi externe du sinus maxillaire, causent une difformité plus ou  
“moins grande en raison de son étendue et de son volume. Celle de  
“l’apophyse montante de l’os maxillaire supérieur ne produit pas seule-  
“ment une difformité; elle occasionne aussi par la compression du canal  
“nasal et même du sac lacrymal un larmoïement continuél avec gonfle-  
“ment de ce sac et inflammation de la peau qui le recouvre.” He also  
adds, “l’os maxillaire inférieur est quelquefois le siège du periostoses  
“d’exostoses et de necroses.”

“accidens sont différens selon que la cloison est simplement  
 “perforée, ou que les différentes parties qui la forment sont  
 “détruites. Quand la cloison est perforée, l’ouverture est  
 “plus ou moins grande, il y a communication des fosses  
 “nasales, et quelquefois une altération de la voix qui est  
 “en général peu marquée. Quand la cloison est détruite;  
 “les phénomènes varient selon l’étendue du mal. Si la portion  
 “de l’os ethmoïde qui soutient les os propres du nez est né-  
 “crosée, ceux-ci s’affaissent, le nez s’élargit et s’aplatit jus-  
 “qu’aux cartilages latéraux. Si c’est une portion du vomer qui  
 “est nécrosée ou sa totalité, il n’y a aucun changement dans  
 “les os du nez, l’ethmoïde les soutenant toujours ; mais  
 “le cartilage de la cloison n’étant plus fixé en arrière par cet  
 “os, il s’affaisse et les cartilages latéraux cèdent aussi, d’où  
 “vient un léger aplatissement du nez, mais peu sensible.  
 “Quand le cartilage de la cloison est détruit, les cartilages  
 “latéraux ne sont plus soutenus, ils s’affaissent et alors,  
 “comme d’une part, les os du nez sont supportés par la lame  
 “perpendiculaire de l’ethmoïde, et que de l’autre les cartilages  
 “des ailes sont maintenus en place par celui de la sous-  
 “cloison qui leur appartient, il y a entre les os et les cartilages  
 “des ailes une espèce de gouttière qui a la figure d’un **A**  
 “renversé, et qui donne au nez un aspect singulier. Lorsque  
 “la lame perpendiculaire de l’ethmoïde et le cartilage de la  
 “cloison sont détruits en même temps, toute la partie su-  
 “périeure du nez s’affaisse, et il ne reste plus qu’un petit bout  
 “de forme pyramidale, qui paraît être appliqué à l’ouverture  
 “des fosses nasales, et qui est formé par les cartilages des  
 “ailes du nez soutenus par ceux de la sous-cloison. Le  
 “nez paraît alors retroussé, parce que la partie supérieure des  
 “cartilages des ailes qui n’est plus soutenue, est portée plus  
 “en arrière que l’inférieure appuyée par la sous-cloison.”\*

It is seldom that the bones of the nose are in any consi-  
 derable degree affected without the palate bones ulcerating,  
 and also exfoliating to a greater or less degree. It is always  
 the superior maxillary bone which is attacked, and not the

\* Traité Pratique de la Syphilis, p. 179.



palatine bone, which forms only the posterior fifth of the palatine arch which is affected. Boyer asks is it because it gives attachment to certain muscles—“*que la nature ne voudrait pas qu'il fut necrosé ?*” It is usually the middle of the horizontal portion of the superior maxillary bone which is the seat of necrosis, and only in a few instances, posteriorly towards its union with the palatine bone. At other times, but more rarely, it occurs in the anterior portion of the superior maxillary bone, and which contains the alveolar processes of the incisor teeth. It is always the suture which unites the two superior maxillary bones that is the part attacked, and more frequently one bone is affected than both. The separation of the necrosed portion always leaves an incurable perforation, unless it be extremely small indeed. But successful instances of this are rare, for cases have been met with in which an aperture, that would not have admitted a large pin, has remained unclosed.

In general, the periosteal affections of the cranium, and of the long bones in syphilis, are accompanied by a degree of pain and tenderness almost amounting to agony. On the contrary, however, the affections of the nasal and palatine bones, even when the devastation is excessive, are seldom accompanied by severe pain. Most commonly, the patient's attention is first awakened by a swelling and uneasiness of the parts, rather than by pain. These symptoms are followed by a discharge from the nostrils, at first small in quantity—serous and inodorous, which often concretes into a thick and troublesome scab. As the disease, however, advances, the discharge becomes purulent—mixed with blood, and when the bone is necrosed, sometimes insupportably foetid. In this state, the disease is termed ozena or ozema. There are cases in which the mucous membrane is so entirely removed, that we can see the denuded bone, but it can almost always be detected by the probe.

When the palate bones are diseased, the discharge from the mouth is seldom considerable, except, in a few instances, when the quantity from the antrum is distressingly large. The soft parts at length ulcerate, and exfoliation of a portion

of the arch follows. When exfoliation has taken place, there is always an aperture by which air, and also liquids, can pass from the mouth into the nose. As long as the aperture is small, the consequences are rather disagreeable than inconvenient; but when large, the voice is altogether changed, and the patient speaks through his nose. Deglutition is also difficult, because the aliment can no longer be pressed against the palatine arch without passing wholly or partially into the nasal cavities. Another inconvenience likewise results, or the occasional passage of the nasal mucosities into the mouth. The duration of the syphilitic affections, either of the nasal or palatine bones, if left to nature or improperly treated, lasts for many months, and only terminates after great destruction of the parts. Under a judicious treatment, a cure is generally effected in a few weeks.

The cartilages, especially those of the sternum, are the occasional seat of the secondary actions of the syphilitic poison. The opportunities, however, of examining these parts are few, since the disease, in almost every instance, is cured, but the symptoms are those of inflammation, with great thickening, and in some few cases, ulceration, and, perhaps necrosis follow.

The fibrous capsules and the ligaments, which surround and unite the articulations of the larger joints, are often attacked, and form a large amount of cases of secondary syphilis. These affections may be either acute or chronic, and do not sensibly differ from those of acute and chronic rheumatism. Boyer states that articular dropsy is a common result, which terminates in an impossibility of extending the affected limb. Inflammation of the interior of a joint, especially of the elbow joint, is by no means unfrequent. Pains simulating rheumatic pains and enlargement of the joints of the fingers, as in gout, are likewise common. The duration of this class of disease is often long, and the treatment unsatisfactory.

*Of the syphilitic diseases of the throat.*—The parts next in frequency of attack and severity of symptoms, after the cutaneous and osseous systems, are those of the throat.\*

\* *Angina syphilitica*, presents all the many different forms which cha-



The mild forms of angina syphilitica, so strictly resemble the ordinary forms of sore throat, that it is universally admitted, the only mode of attaining a true diagnosis of them, is a minute inquiry into the history of the disease. The old writers imagined that syphilitic angina was to be distinguished by a deeper red or copper-colour, from simple inflammation, but the mucous membranes are not covered with a pigment like the skin, and, consequently, this supposed difference of colour does not exist. It will be plain, therefore, that any satisfactory account of the mild forms of syphilitic sore-throat, is nearly impracticable. The severer sloughing, phagedenic forms of the disease, are palpable enough. The simplest classification is, perhaps, to divide them into angina syphilitica mitior, and into angina syphilitica gravior.

The first symptom which indicates the existence of *angina syphilitica mitior*, is a slight soreness and some constriction of the fauces, which, when examined, present a slight blush of inflammation, and, in many cases, the inflammation now resolves, and the disease is at an end. In other cases, however, ulceration takes place of the soft palate and tonsils—and less frequently, also, of the palate and pharynx.

In some instances, the inflammation is characterized by an exceedingly hard and enlarged state of the tonsils, whose surface is covered by patches of a viscid mucous or lymph, and at a subsequent stage, these parts become the seat of superficial ulcerations. In other cases, the tonsils are less swelled, and a small chronic ulcer forms on each tonsil, but of no great depth; while in others, it is attended with “a racterise angina from ordinary causes—together with two, which are, perhaps, peculiar, namely: the wide extending chronic sloughing ulcer, and the superficial phagedenic ulcer. Taking them altogether, Mr. Carmichael conceives they may be divided into three primary forms, or into the erythematous, the phagedenic sloughing sore-throat, and the true syphilitic sore-throat, with “a fair loss of substance.” Mr. Mayo divides them into four, or into excoriation, superficial ulceration, excavated ulcer, and sloughing ulcer. It is hardly possible to be content with these, or to suggest a better classification; but, perhaps, the simplest division and the most devoid of all hypothetical assumption, is into angina syphilitica mitior, and of angina syphilitica gravior.

fair loss of substance," forming Mr. Hunter's syphilitic sore throat. The most characteristic, however, of this class of disease, is the superficial ulcer which spreads broad and wide, having a regular edge, but never penetrating deep. This ulcer is often extremely troublesome, of long duration, and of difficult cure, having the character of a superficial phagedenic ulcer. Its more usual seat, as far as I have observed, has been the entire back of the pharynx, but it may occupy any other portion of the fauces.

The *angina syphilitica gravior*, is characterised by a much less considerable enlargement of the tonsils than in the former variety, but the inflammation is usually much more extensive, embracing the tonsils, the velum palati, the uvula, and very commonly the pharynx. The appearance and nature of the inflammation, is also much more asthenic while the termination is in a deep, foul, and sometimes fatal ulceration.

This formidable disease usually begins by a diffuse inflammation of the mucous membrane of the throat, and in a few hours, a foul and deep ulcer generally forms on each tonsil, with a broken down, irregular edge, and a base covered with a dirty ash-coloured slough, the whole surrounded by a deep-coloured erysipelatously inflamed margin. The velum palati is usually attacked about the same time, and the inflammation may begin either on the anterior or posterior surface of that membrane. In that latter case, if the disease be rapid, the velum may be destroyed almost before the disease is discovered, or even suspected to exist.

The uvula is usually involved in the disease, and the part most liable to be attacked, is the base. Around the base, an eating ulcer forms, and so rapid in its course, that the uvula is constantly seen hanging in the fauces by a mere shred, so that the least delay in the administration of proper remedies is often followed by the entire loss of that part. Indeed, in the greater number of cases, it is already detached before the patient is admitted into the hospital. From the tonsils and soft palate the inflammation may spread to the arch of the palate, or up the nasal fossa, and there lay the



foundation of the destruction of the nasal and palatine bones.

The most appalling symptom, however, is when the inflammation extends to the pharynx. In this case, the ulceration may be so situated as to be hid by the velum or by the root of the tongue, and thus concealed, may make extensive ravages before it is discovered. More commonly, however, a single ulcer forms in the central and visible part of the pharynx, having an irregular broken down edge, a dirty base, and surrounded, as in the former case, with a wide extent of angry erysipelatous inflammation. This frightful ulcer sometimes continues to spread as far as the eye can reach, so that the whole of the back of the pharynx is one universal foul sore—often penetrating so deeply that the spinal bones may sometimes be both seen and felt, and the throat of the patient, in this lamentable state, presents to the sight one vast continued ulcerated cavity.

From the pharynx, the inflammation may extend to the eustachian tube, and the patient be rendered either temporarily or permanently deaf. Occasionally, also, it involves the glottis, epiglottis, and even the larynx. When laryngitis ensues, the symptoms are a whispering stridulous voice with difficulty of breathing, constant cough, and copious expectoration. The epiglottis has also been known to slough off, and then the patient can only swallow by holding his nose. Mr. Carmichael gives two cases of sudden death in the Lock Hospital, from foreign bodies, under these circumstances, slipping into the trachea; and Mr. Mayo another, in which he applied a ligature round the common carotid, on account of hæmorrhage from the ligual artery. When this pharyngeal disease terminates favourably, a cicatrix forms, much whiter than the mucous membrane, striated and banded in every direction, and as it has less vitality than the membrane, for which it is the substitute, it is liable to frequent but slight relapses. If the patient falls, the throat becomes dry and brown, the pulse rapid, great restlessness supervenes, the legs swell, and the patient dies with the worst symptoms of hectic or continued fever.

Syphilitic angina is rarely accompanied by fever in the early stages. If left to itself, is of almost endless duration, and sometimes of fatal termination. It often co-exists with every other secondary symptom.

*Of the syphilitic diseases of the eye.*—The eye is less frequently affected by the syphilitic poison than the skin, the bones or the throat; but still, inflammation of this organ is, by no means, unusual, and its principle seats are the conjunctiva, the transparent cornea, the iris, and judging from the generally painful state of the eye, the retina, and perhaps, also the entire globe of the eye.

Syphilitic inflammation of the *conjunctiva* may exist per se, or may be conjoined with iritis, and the latter is much the most frequent. Its pathological character is diffuse inflammation, of greater or less intensity of the conjunctiva, varying from an arborescent state of the vessels, to a general injection, changing the brilliant white of this membrane to a livid red. Immediately around the cornea, a zone of still deeper intensity forms, which strikingly contrasts with the transparent cornea.

The transparent cornea, though nourished by vessels carrying transparent colourless fluids, is, nevertheless, susceptible of high inflammation. This inflammation occasionally exists per se, and may terminate by effusion of lymph or ulceration. When lymph is effused it is poured into the lamellated structure of the cornea, so that the eye is dull, and the cornea rendered opaque, and if it be deposited generally over the pupillary portion, the membrane becomes impenetrable to light, and blindness is the consequence. If the disease proceeds, red vessels shoot into the effused lymph, and the superficies of the cornea frequently ulcerate.

The most remarkable affection, however, in syphilitic ophthalmia, is *iritis*, which usually accompanies the preceding forms of the disease, and its termination may be by resolution, by throwing out of lymph, or by the effusion of pus. In general, the syphilitic inflammation attacks the posterior rather than the anterior surface of the iridial membrane, which is, in consequence, thickened, and the pupil so dimi-



nished, as often scarcely to exceed the size of a pin's head. The iris, thus contracted, generally forms adhesions more or less partial to the capsule of the crystalline lens, so that the pupillar edge appears puckered, irregular, and, instead of a circular, often appears of a polygonal shape, with two, three, or more sides. The inflammation, however, is rarely confined to the posterior, but very constantly involves the anterior surface of the iris. "In this case," says Mr. Lawrence, "the iris loses its brilliancy, appears dull and dark, and the beautiful fibrous arrangement, which characterises it in the healthy state, is either confused or entirely lost. A light coloured iris assumes a yellowish or greenish tint; a dark coloured iris, a reddish brown." Vessels carrying red blood, are now seen radiating on the outer surface, often depositing lymph of a reddish brown or ochre-colour, or tinged with blood in various manners, and, occasionally, in such quantities, as to hang pendulous in the outer chamber of the eye, or else to thrust the iris forward by its accumulation in the posterior chamber of the aqueous humour. If the inflammation proceed, this lymph may become organized, and present a permanent obstacle of the transmission of light, or the capsules of the lens may be thickened, and rendered so opaque, that the patient may become temporally or irrecoverably blind. The disease may proceed to still further destruction of parts, but, in general, it is early subdued by medicine, and terminates by resolution, before any irremediable alteration of structure takes place. In this case, the red vessels disappear, the effused lymph is absorbed, and the adhesions being recent and slight, are readily broken down, and the patient recovers the perfect use of the organ. But its powers are often, for a time, impaired, so that vision is either confused or weak; neither does the pigment of the iris immediately resume its colour, but is so changed, that a hazel eye is turned to grey, and a black eye, to a green one; and, from different degrees of inflammation, the patient, after his recovery, has sometimes each eye of a different colour—an unsightliness, which may last for a considerable time.

Inflammation of the cornea, or of the conjunctiva, is rarely

accompanied by severe pain, but more commonly by soreness, a sensation of dryness, great weakness of sight, and by an increased lacrymal discharge. Iritis is usually attended by severe, agonizing, deep-seated pain, and by great intolerance of light. There are, however, a few instances in which the pain is trifling, and the sight merely weak. Syphilitic ophthalmia is, in general, double, and only in a few instances, limited to one eye. The duration of the various forms is usually short, as they readily yield to a mercurial treatment. In general, iritis is preceded by one or more of the secondary symptoms, and most commonly is the affection which terminates the disease. It is said to be more frequent in women than in men, but this proposition is not established.

*Treatment.*—The cure of the primary ulcer has never been esteemed one of the great difficulties in the treatment of syphilis, for, at all times, it has been observed often to yield to very trifling remedies\*—very generally to greater or less doses of mercury, and only in a few instances, assuming an intractable, or phagedenic form. In practice, however, this problem has been rendered one of the most intricate in medicine, from the various theories which have been connected with it. Some, for example, have considered the primary ulcer to be at first a local disease, and that early cauterization would prevent the occurrence of all the secondary symptoms; others again, have held that mercury was essential to the cure of the primary symptoms, for without it they would not heal; while others, again, have affirmed that medicine to be, not only a remedy for the primary forms of the disease, but, also, a specific antidote against the poison of syphilis, so that a given quantity was an infallible prophylactic against the secondary symptoms, and a cure for them in

\* Morgagni says, “I remember when I was quite a young man and “went to Bologna that both methods of using mercury, internal and “external, were so far deserted, that I never saw any physician make use “of them, or even heard of his using them for the whole space of eight years “during which I studied there.” “What medicines have you seen these “very excellent physicians make use of against lues venerea?” “Why “the decoction of woods.” Epist. 58, and 16.



every stage. It will be proper first to investigate these theories, for if they can be shown to be unsound, it will follow, as a necessary consequence, that the rule of treatment of the primary sore, is to heal it as rapidly as possible, and to employ for that purpose the simplest and least injurious means in our power.

Mr. Hunter first promulgated the doctrine that syphilis was, in the first instance, a strictly local disease—that the poison applied to the affected part was not absorbed, but lay in the part, producing the primary sore by a local irritation; and that it was the secretions of the sore so produced which were absorbed, and contaminated the constitution. He contended, therefore, that cauterization at an early period converted the primary ulcer into a common non-contagious ulcer, prevented the absorption of the poison, and saved the constitution from an attack of the secondary symptoms.

The practice of cauterization has, consequently, been very generally adopted; but, looking to the results, Ricord is, perhaps, the only great authority who considers them to be entirely satisfactory; and he affirms there is no instance of a primary ulcer destroyed by cauterization within the first five days, being followed by secondary symptoms. There are few persons, however, whose experience entirely accords with this conclusion. Mr. Hunter, who proposed the treatment, or, at least, invented the hypothesis, so little relies on it, that he recommends a course of mercury, even after cauterization has been most successfully employed. It is well known, likewise, to all military surgeons on the continent, that soldiers make use of caustic as soon as a chancre forms, and yet they are not preserved from the secondary symptoms. Cases have, also fallen under the observation of Dr. Collis, in which a chancre has been cut out on the first or second day, and yet the secondary symptoms have followed.\* There are many practitioners, likewise of most extensive experience, who think the secondary symptoms have not only not been prevented by cauterization, but have occurred with

\* P. 76.

even greater frequency after it has been practised. Thus, Biett affirms, that this operation increases their frequency and aggravates their severity; and he is supported in this opinion, by no less a person than Dupuytren. Perhaps the following singular case demonstrating the influence of this hypothesis, and the sad consequence to which it may lead, may not be without interest. A sailor having a sore on the glans penis, applied to a practising quack at Rotherhithe who affirmed no other course remained than to amputate the affected part, and the man underwent the operation. The disease now appeared at the cut extremity of the penis, and it was now declared that nothing could save his life but the removal of the entire member, and the patient was once more submitted to the knife; the disease, however, shortly after appeared on the stump, and in this state he was brought to St. Thomas's Hospital, and placed under the care of Mr. Henry Cline. The ulcer continued to spread, the testicles sloughed off and were removed on a poultice, and in a few days the man died, a victim of mal-practice. It follows, therefore, that experience has by no means established the hypothesis of syphilis being in the first instance a local disease, and, consequently, that cauterization is of no other value than as a means of healing the primary sore.

Mr. Hunter also taught that without mercury the primary sore either would not heal, or would be followed by secondary symptoms, so severe as to terminate in the mutilation or in the death of the patient. The conclusion may not be strictly correct, but on his authority it was generally believed towards the close of the last and the beginning of this century, that mercury was essentially necessary to the cure of the primary ulcer. Impressed with this opinion, the surgeons of the British army, who served in the Peninsula, saw with astonishment that the natives of Portugal entirely neglected the primary sore—certainly used no mercury for its cure, and nevertheless, that it healed spontaneously. This fact was too important to be forgotten, and on the return of peace, an extensive series of experiments was instituted in the military and civil hospitals of this country, and of the



continent, which have distinctly proved that every form of primary venereal ulcer will heal without mercury. It is even debated whether a mercurial treatment does not prolong the time of the healing of the primary ulcer. The British writers on syphilis, as Rose, Hennen, Guthrie, Travers and Carmichael all contend that mercury does, and will, heal a primary sore in a few weeks, that would not heal spontaneously, or by any other mode of treatment, in as many months.\* On the contrary, Duvergie has collected an account of 59,620 cases of primary syphilis, *as he terms them*,† treated in the different hospitals of Sweden, Hambro', Munich, France, England and America; and, of this number, he states 20,276 were treated with mercury, and 39,344 cases without mercury, and that the mean duration of the former was forty-two days, while that of the latter was only thirty-two days, or a third less.‡ It follows, therefore, that the doctrine

\* Dr. Collis says p. 317, "when this plan (the non-mercurial treatment of syphilis) first attracted the notice of the surgeons of Great Britain, both my colleagues and myself adopted it in our hospital. We tried it till we became convinced of this fact, that their (the patients) stay in the hospitals, proved, in general, very protracted, so that they became impatient of this treatment, especially when they saw others with similar symptoms in the same ward have their complaints more quickly cured by the use of mercury. In private practice, I also followed it for a time, but not finding it superior in point of quickness of cure, or of security against a relapse, and observing that these relapses were more frequently reiterated in a short time, I ceased to employ it, except at the express solicitation of the patient."

† There is great difficulty, however, in understanding these data, for the continental writers include gonorrhœa, orchitis, &c. as cases of primary syphilis. Thus, of 6746 persons treated at the military hospital of Rennes, "*atteints de maladies vénériennes primitives*," the numbers attacked with ulcers were to the whole number as 1 to  $3\frac{8}{5}$  or only one third. The remaining two thirds, consequently, of the cases would not in general be considered as syphilitic in this country.

‡ Hennen, p. 541, is of opinion that different seasons of the year may influence the results, for, upon trials made at Edinburgh Castle, during the half year ending 20 December, 1818, and the 20th June, 1819, and conducted with the utmost accuracy, and entered upon with the strictest disposition to perfect impartiality, he obtained in the former period in forty-

of mercury being necessary to the healing of the primary ulcer is not founded on fact. It must be admitted that this medicine is occasionally of great use in effecting that object, but there is hardly an instance of mutilation or of the death of the patient following its omission.

Another opinion has also very generally prevailed, or that mercury, though, perhaps, not actually essential to the healing of the primary sore, is, notwithstanding, a specific antidote in syphilis, and that a given quantity exhibited while it is yet open will neutralize the poison and give the patient an entire exemption from all the secondary symptoms.

But that this hypothesis is equally unfounded with the former, may be inferred from the various quantities which different persons have considered necessary for this purpose. The early practitioners, for instance, profusely salivated the patient; those that followed, used mercury seven cases treated without mercury, and in eighteen cases treated with mercury, the following times of cure :

Description of Cases treated.	Average number of days required for cure without mercury.	Average number of days required for cure with mercury.
Ulcers with the reputed syphilitic characters.	$24\frac{1}{7}$	$10\frac{2}{9}$
Ulcers without the reputed syphilitic characters	$15\frac{3}{4}$	$15\frac{3}{13}$
Buboes ending in resolution, and following Hunterian chancres	$28\frac{1}{2}$	16
Buboes ending in suppuration and following Hunterian chancres	$28\frac{2}{3}$	$12\frac{1}{8}$
Buboes ending in suppuration and not following Hunterian chancres	$52\frac{1}{2}$	32

In the latter half year, of sixteen cases treated with mercury, and without mercury.

Hunterian ulcers	9	$18\frac{2}{3}$
Non Hunterian ulcers	$26\frac{5}{6}$	$26\frac{7}{11}$
Buboes discussed following non-Hunterian ulcers	$22\frac{2}{5}$	$33\frac{1}{2}$
Buboes suppurated following non-Hunterian ulcers	27	$76\frac{1}{2}$

These results, he adds, are peculiarly striking, and show the necessity of patiently waiting, till further experiments respecting the merits of each sort of treatment shall become more fully developed.

Ricord treated two hundred and ninety-two men by mercury, and



less freely, but exhibited it for many weeks, and even months after the healing of the primary sore, while others, again, have considered that quantity sufficient which would heal the primary sore, and these opinions have alternately prevailed, and still divide the profession.

A specific antidote, however, is that remedy which will not only heal the present symptoms, but which will prevent the occurrence of all future ones from the same cause. Still such great diversity of practice in the cure of the primary symptoms distinctly shows that secondary symptoms have and will follow in a given number of cases, however large the quantity of mercury administered, or however trifling the appearance or short the duration of the primary ulcer. But, to strengthen this argument, there is a remarkable series of experiments, if they could be entirely relied on, which seem to demonstrate that the secondary symptoms follow, even with greater frequency, in proportion to the quantity of mercury used. In Sweden, for example, as late as the year 1814,\* it was the practice to heal the primary symptoms by most free inunction; and, under this system, it was calculated that the number of cases of secondary affections of the bones was no less than 54 per cent. of the whole number treated. In 1814, however, this treatment was changed, and a milder method adopted, or by fumigations, by other local applications of mercury and by diet, and the result is stated to have been so eminently successful, that the College of Health reported that the cases of diseased bones

five hundred and ninety-eight without mercury, but it required forty-two days, on an average, to cure the first, and only twenty-eight days the second.

From 1824 to 1827, Fricke treated in the hospital at Hambro' 1649 cases, or five hundred and eighty-two by mercury, and 1067 without mercury. The mean duration of the treatment of mercury was eighty-five days, of those treated without mercury only fifty-one days.—Desruelles, p. 111.

Duvergie treated 5427 soldiers and 658 private persons. The duration of non-mercurial treatment was thirty to fifty days, that of the mercurial treatment, eighty-five to ninety days.

\* Duvergie.

were reduced from the large number mentioned, to about  $6\frac{1}{2}$  per cent. It is added, also, as a consequence, that instead of there being six hospitals for the reception of venereal patients, there is now only one in all Stockholm. It is rendered probable, likewise, that not only is the frequency of the occurrence of the secondary symptoms affected by an excessive use of mercury, but also that their severity is increased; for, it is generally believed, that the phagedenic sore throat, the extensively ulcerated bones, and, in fact, all the more formidable of the secondary symptoms, have been the result of this excess of mercury, rather than of the action of the poison. It follows, consequently, that mercury is not a specific antidote capable of neutralizing the poison of syphilis, but merely an agent, capable of curing a present symptom. Indeed, it is quite singular with what rapidity one secondary symptom often follows another, when the antecedent has been treated with mercury, even to profuse ptyalism—for, in many instances, the mouth is scarcely healed, for the cure of a periostitis, than the party is obliged to be salivated for some disease of the skin—and this ptyalism will hardly have subsided, than a violent attack of iritis renders a third action of the same remedy necessary.

In conclusion, therefore, it seems proved that syphilis is not, at any moment, a local disease, and that the knife and the caustic are, consequently, of no other value than as a means of healing the primary sore. It is proved, likewise, that mercury is not a specific remedy in the sense of neutralizing the poison of syphilis, and that the practice of inundating the constitution with that medicine after the primary sore has healed, increases the frequency as well as the severity of the secondary symptoms. It is determined, also, by an endless series of experiments, that mercury is not necessary to the healing of the primary ulcer; and, if these data be granted, it follows, that the rule of treatment deducible from them is to heal the primary sore as soon as possible, and by the simplest means, both as productive of the greatest comfort to the patient, and as the best prophylactic against the secondary symptoms—also, to treat each succeeding symp-



tom on the same principle, as the surest mode of preventing the occurrence of any further number of the series, and, consequently, of shortening the whole duration of the disease.\* Such is the theory of the treatment of syphilis, and it will be seen, the practice is daily becoming more and more in accordance with it.

The treatment of syphilis may be divided into the cure of primary syphilis, and into the cure of secondary syphilis.

#### TREATMENT OF PRIMARY SYPHILIS.

Whatever difference of opinion may have formerly prevailed, respecting the use of mercury in primary syphilis, the authority of Mr. Hunter, for a time, terminated the dispute. This eminent surgeon held, “that in every case of a chancre, let it be ever so slight, mercury should be given internally, even in those cases where they were destroyed on their first appearance.”† And also, “that the quantity thrown in, either externally, or internally should be such as should, in common, affect the mouth slightly;” and finally, “that it must be in proportion to the time that the absorption may have been going on,”‡ or for the time a chancre has taken to heal.

Mr. Hunter, however, in laying down this doctrine, affirmed that there is hardly any disorder that has more diseases resembling it, in all its different forms, than the venereal disease. “Other diseases shall not only resemble the venereal in appearance, but in the mode of contamination, proving themselves to be poisons, by affecting the part of contact, and from them (it) producing immediate consequences,

\* “L’expérience,” says Ricord (p. 606), “si facilement acquise dans le champ vaste et fertile de l’Hôpital des Vénériens, m’a appris comme règle générale, que la meilleure condition prophylactique des symptômes constitutionnels était la guérison radicale sur place de l’accident primitif dans le temps le plus court possible, et sans qu’il restât d’induration; et cela, quelle que fût la méthode du traitement employée—l’induration qui persiste après un traitement mercuriel, ou tout autre laissant presque à coup sûr, le malade exposé aux accidents consécutifs.”

† P. 240.

‡ P. 228.

“ similar to buboes, and, also, remote consequences, similar “ to lues venerea.”\* Mr. Abernethy, who closely followed Mr. Hunter, adopted this view, and termed these similar diseases, pseudo-syphilis, and we principally owe to his example the practice of treating this large class of disease by minimum doses of mercury, or by blue-pill. Such were the opinions entertained of the cure of primary syphilis, when the British army surgeons demonstrated by a series of reports, so voluminous, we are told, as to fill the office of the Army Medical Board, that every primary sore would heal without the use of mercury, or, indeed, of any medicine whatever. It is important, with these opposing facts before us, to see into what state the practice has settled down.

*Treatment of the venerola simplex.*—On examining the statistical returns of the army, subsequent to 1818, it appears that 14,353 cases of primary ulcer have been treated at the following stations.

Diseases.	Dragoon Guards, and Dragoons.	Gibraltar.	Malta.	Ionian Islands.	Bermudas.	Canadas.	Windward and Leeward com- mand.	Jamaica.	Total.
Syphilis primitiva . . .	1415	749	1806	826	31	852	342	284	6305
Ulcer penis non-syphiliticus . . . . .	2144	446	1351	876	93	2551	503	84	8048

It seems, therefore, that the larger proportion of the primary sores now treated in the army, are considered non-syphilitic, probably from their having been nearly if not altogether, healed without mercury except, perhaps, some wash or other local application, showing a wide abandonment of the principles of Mr. Hunter and of Mr. Abernethy. This class of sores unquestionably embraces venerola simplex, or unindurated chancre; and the principle remedies for this description of ulcer, according to Dr. Hennen,† are, “confinement to bed in many cases, in all to the hospital, spoon diet, occasionally general bleeding, as in six or eight cases out of 1,940, purgatives, antimonials,

\* P. 381.

† P. 551.



emollient soothing applications, generally cold or warm water, mixed frequently with the liquor plumbi. In the latter stages, the lotio hydragyri sub-muriatis, or muriatis in aqua calcis, or else the lotio cupri sulphatis vel argenti nitratis, or other similar means.

In civil life, also, there is nearly as great an agreement in the treatment of the primary sore, as in the army. Most writers recommend that the unindurated ulcer should be treated at first as a simple ulceration; or, by cleanliness, rest, abstinence, and by applying to it the most mild and simple dressings, and many ulcers that will be followed by secondary symptoms, will heal under this simple treatment. If the ulcer does not put a healing appearance after a reasonable time, the patient should make use of more active dressings, as the black wash. If the sore should still remain open, a mild and judicious administration of mercury should be had recourse to, till the sore is healed. In most cases, the pilulæ hydragyri, gr. v., twice or thrice a-day, is sufficient, and the success of Mr. Abernethy has proved that a large majority of the primary ulcers will heal under this treatment. For those, however, who may wish for a more detailed account of the treatment proper to be pursued, the following are the directions of Mr. Evans.

“As this sore (*venerola vulgaris* aut *ulcus elevatum*,\* runs  
“a regular course, little in the way of treatment can be  
“done to hasten its cure; indeed, in either its first or second  
“stage, any interference, except to allay irritation, will be  
“attended with a contrary effect, and it is only the course of  
“the third stage, that anything can be employed to accelerate  
“its termination. The elevation of the surface of this sore,  
“through the greater part of its third and fourth stages, is well  
“calculated to point out as the natural indication of cure,  
“the destruction of the elevated portion, so as to bring the  
“sore upon a level with the surrounding healthy parts, and  
“thereby quicken the process of cicatrization. I have, in  
“some cases, acted upon this principle, but the consequences

\* P. 84.

“have been that I have lost time, and put my patients to  
“great and unnecessary torture.”

“Mercury thrown in either by friction or by the mouth, so  
“as strongly to affect the system, has appeared, in many in-  
“stances, to have a still greater power in retarding the healing  
“process in this disease. I have seen sores of this class,  
“which, from their size, would have required (if left to them-  
“selves) not more than from seven to eight weeks before they  
“would have healed, kept open for nearly four months by the  
“actions of that mineral, and in other cases, when it has been  
“used without producing this effect, it has not appeared to be  
“in any way very beneficial.”

“Having pointed out what I consider as the two greatest  
“errors that can take place in the treatment of this ulcer, it  
“remains to shew that plan of cure which has been found the  
“most beneficial.”

“When this sore is in its first or pustular stage (in which,  
“by the bye, it is seldom the practitioner has an opportunity  
“of seeing it) it must be guarded from friction, attention paid  
“to keeping the patient’s body open, and in the event of there  
“existing any considerable degree of inflammation, which is  
“seldom the case, the parts must be kept cool by the weak  
“solution of the acetate of lead. In the second stage, when  
“the patient experiences much pain (the general cause of  
“which has been before pointed out) the application of a warm  
“poultice will, most generally, give relief, and when there  
“happens to be much irritation in the part, it may be con-  
“tinued with advantage through the whole of this stage; in  
“ordinary cases, however, it is sufficient to remove the scab  
“by the poultice, or the application of soft dressings or other-  
“wise, and the pain soon ceases, after which, it may in future  
“be avoided by the application of the ung. ceræ, which will  
“prevent the reformation of the scab, and consequently the  
“recurrence of the pain.”

“If the scab be small and there be no pain to render its  
“removal advisable, it is best not to interfere, nature proving  
“herself, in these cases, to be the best surgeon.”



“Such is the practice to be pursued when these sores are  
“situated upon the outer skin of the prepuce, or the scrotum,  
“or on other non-secreting parts; when they happen on the  
“inner surface of the prepuce, the object to be held in view  
“is the same as when they occur externally, namely: the  
“lessening of irritation, which is general much greater when  
“the sore is behind the glans, than when it is on the external  
“skin of the prepuce, the dorsum penis, or the scrotum; for  
“this purpose, a piece of lint, kept constantly wet, with the  
“wash before spoken of, should be applied to the part.”

“As the sores upon this part do not scab, the pain, often-  
“times attendant upon them, arises from some other cause  
“than the confinement of matter. It is not, however, a general  
“attendant, but is most frequently owing to the friction of the  
“clothes, &c., in walking, which, as well as the inflammation,  
“swelling, and phymosis, which occasionally take place, is to be  
“guarded against by rest, abstemiousness, and paying attention  
“to the state of the bowels. When, in spite of every attention,  
“these unpleasant symptoms do happen, we must endeavour to  
“remove them by a purgative, in the first instance, by a strict  
“observance of the antiphlogistic regimen, a recumbent pos-  
“ture, and the application of cold washes, or (in the event of  
“these failing) of poultices to the penis, the sores themselves  
“being kept clean by frequent injections of some mild seda-  
“tive wash.”

“About the termination of the third stage, and throughout  
“the whole of the fourth, the treatment to be pursued is simi-  
“lar, wherever the ulcers may be situated. That which inter-  
“rupts their course the least, and seems to be of the utmost  
“advantage, is touching their surface daily with the sulphate  
“of copper, so lightly, however, that it may act as a stimulant,  
“and not as an escharotic; applied in this way, it appears to  
“give tone to the granulations, and thereby induce them to  
“contract within narrower limits. The same effects may be  
“produced by the ung. hyd. nitr. reduced to one third or  
“one half its strength. I have also seen good effects from a  
“weak ointment of verdigrease, from the strongest mercurial

“ ointment, and from the mass of blue pill spread upon lint,  
“ but upon the whole, have found the sulphate of copper the  
“ most generally useful.”

“ After the application of the sulphate of copper, when  
“ the sore is on the external integument, a little simple  
“ dressing should be applied to defend the part from  
“ friction, and prevent the shirt, &c., from adhering to the  
“ sore. When on the inner surface of the prepuce, the glans,  
“ or corona, a solution of the sulphate of copper, in the pro-  
“ portion of half a grain to the ounce of water, may be sub-  
“ stituted for the acetate of lead, should it have been em-  
“ ployed in the former stage of the sore.”

“ Throughout the whole of the first and second stages of  
“ this disease, it is in the highest degree expedient to confine  
“ the patient to bed ; by this, the formation of bubo will be  
“ often prevented, or in the event of its forming, the chance  
“ of resolution will be greatly increased ; local irritation, also,  
“ will be either entirely prevented or much lessened, and con-  
“ stitutional affections avoided, or the risk of their appearance  
“ greatly diminished.”

“ When the symptomatic fever runs high (which, by the  
“ way, it seldom does after the commencement of the third  
“ stage) we must put the antiphlogistic plan, in its fullest  
“ extent, into practice, for it has been already said, indepen-  
“ dently of the effect that the constitutional affection has in  
“ impeding the regular process of the local disease, it is gene-  
“ rally the forerunner of consecutive symptoms.”

The above methods, recommended by Mr. Evans, are so generally successful in the cure of the unindurated ulcer, that Mr. Carmichael, to whom the profession stand deeply indebted for his ingenious essay on this disease, says :—“ If I am obliged to follow either system exclu-  
“ sively, for which I see no possible necessity, I should  
“ certainly prefer the non-mercurial plan of treatment, as that  
“ which is fraught with far less dangerous consequences,”  
and, consequently, he considers the antiphlogistic to be the rule, and the mercurial, the exception, in the cure of this class of disease, which he esteems to be so extensive as to constitute,



at least, three fourths of all the venereal complaints prevalent in this country. Mr. Skey, also, after stating that a mild local treatment, rest, abstinence, and attention to the general functions, are the true bases of the treatment of sores of this description, adds:—

“I have been in the habit, for some years past, of treating such cases, night and morning, with bread pill, and I am acquainted with no form of medicine which as applied to the cases before us, is both more efficient and less objectionable.” “As a general rule, there is no necessity for the administration of mercury in any form or quantity, at the same time, you need not forswear its use.”\* “In chancre,” says Mr. Mayo, “if the opinions of the civilized world were to be taken, they would probably be found to be pretty equally divided, as to whether or not a specific treatment is requisite.”† At Hambro’ and Berlin,‡ we are told that the non-mercurialists are on the increase. Ricord also states, that for the cure of the regular chancre, without complication or induration, a local treatment is sufficient, but at the same time, the patient must be kept quiet; but he objects to one uniform dietetic treatment. “In powerful individuals prone to inflammation, a low diet with diluents is necessary; but nothing,” he adds, “can be more injurious than such a diet to a person who has been previously living on insufficient nourishment, for in such cases, a tonic regimen, a fuller diet, and all that improves the general health, must be employed. The unfavourable course a chancre sometimes takes, it should be remembered, is owing to a bad constitution.” Such is a sketch of the general treatment of the unindurated syphilitic ulcer, and; perhaps, in the present state of medicine, it is impossible to offer more precise rules. Ricord candidly confesses he knows of none, and that he is governed, in his employment of mercury by a happy empiricism, first attempting the cure by local

\* Medical Gazette, 1838-9, p. 265-6.

† Medical Gazette, 1839-40, p. 194.

‡ Graves’s Lectures, Med. Gazette, 1839, p. 852.

washes and dressings, and should these fail then by mercury either by the mouth or by inunction, using both the general and local means, if the ulcer improves, but suspending them if it becomes worse. In addition to the above remedies, many practitioners recommend the use of lunar caustic. Dr. Wallis recommends this application at whatever time the sore is first seen, and speaks of the process of cicatrization being greatly assisted by this means. Mr. Carmichael limits the time to the first stage, and before pus has formed. Ricord also tells us to abstain from using the caustic to the part which is granulating, and to confine its employment to points still in a state of ulceration,\* but these discrepancies show that the practice is any thing but determined.

“Of all the venereal complaints, the *venerola superficialis*, “the patchy excoriation, or chancreous excoriation, as it was “formerly termed,” says Mr. Carmichael, “is the most easily “cured. Any mild astringent lotion injected five or six “times daily between the glans and the prepuce, will remove “it in a few days. That I generally employ, is the yellow “mercurial lotion above mentioned, but weak solutions of “acetate of lead or sulphate of zinc, or even simple ablution “may answer equally well. It is so easily cured under “common attention to cleanliness, that I cannot conceive “how some practitioners can have the conscience to subject “their patients to a five or six weeks course of mercury for a “complaint that simple water may remove in a few days.” Ricord speaks highly of passing the solid nitrate of silver between the prepuce and glans, in these cases, and thus cauterizing the whole surface within reach. It is seldom, however, that such severity of treatment is necessary.

*Treatment of the venerola indurata.*—The indurated ulcer as well as every other form of primary syphilis has been successfully treated without mercury. Mr. Rose is particularly explicit on this point, and details several cases of primary ulcer, possessing the surrounding callosity, and other characters of the Hunterian chancre, which were cured with-

\* P. 556.



out mercury; Mr. Guthrie affirms, also, that “every kind of syphilitic ulcer of the genitals, of whatever form or appearance, is curable without mercury.” Mr. Carmichael likewise says, in consequence of these authorities, as well as those of Dr. Thompson and of Dr. Hennen, that he determined to demonstrate whether *true syphilis* like the other forms of venereal disease, were capable of being cured without the aid of mercury; and, he adds, “I have had sufficient proofs, though few, to convince me that syphilis, as well as the others, is capable of being cured without mercury.”

But it does not by any means follow, that the non-mercurial is the most judicious mode of treatment. Indeed, all authors are agreed that recovery under that method has been remarkably slow, while, when mercury is exhibited, the healing of the sore has been certain and rapid. Dr. Wallace is so satisfied with the advantages of mercury in hastening the cure, that “we shall often observe,\* that in twenty-four hours after a mercurial treatment, the appearance of the ulcer will sometimes change, and, from being of a dingey yellow, or ash-coloured white, will become of a healthy red, and that this alteration of colour will be quickly followed by a process of cicatrization, sometimes so rapid, that there is no time for a reparation of lost parts, and the process of granulation, and the sore is, therefore healed with loss of substance.” Ricord, also, says that, although the exhibition of mercury for unindurated ulcer is often more hurtful than beneficial, yet the circumstance of induration immediately transforms it into a therapeutic means of great power—“d’une puissance extreme”; and,† he adds, “I have, therefore, recourse to a mercurial treatment, every time that a certain induration accompanies a chancre, so as to prevent its cicatrizing, or persists after its superficial cure.”

In the treatment of the Hunterian chancre, therefore nothing is doubtful or perplexing. The rule of treatment is by mercury, and the exceptions are those cases where its use is forbidden by a debilitated, or scrofulous diathesis or by other

\* P. 100.

† P. 577.

peculiarity of constitution. The manner of introducing mercury into the system must be left in a great measure to the discretion of the practitioner. If the case be slight, five grains of *pilulæ hydrargyri* twice or thrice a day is sufficient. It is more common, perhaps, when the case is well marked, to direct the patient to rub in half a drachm or a drachm of strong mercurial ointment every night, and this quantity is generally sufficient to affect the mouth in six or eight days, and to produce, considerable soreness at the end of twelve days. "As soon as this takes place, the chancre," says Dr. Collis,\* "appears a little larger, at the same time "less deep; we next find the surrounding hardness declines, "that granulations begin to arise, that the discharge becomes "purulent, that the entire surface of the ulcer becomes clean "and red, in a few days more the ulcer contracts, a thin cuticle forms on its edges, and this daily increases until the "ulcer is finally healed."†

When the chancre has cicatrized, and the tissues which have been its seat have recovered their healthy state, the disease is cured. Sometimes, however, an induration remains, and in this case the cicatrix often ruptures, and relapses are the consequence. Under these circumstances, we should be cautious not to lay aside the use of the ointment too soon, and the patient, at the same time, should rub the part twice a day with mercurial or iodine ointment, a practice often successful when the indurated portion is seated on the skin, but not so commonly when on the mucous membrane. Delpech, and many other surgeons, have recommended excision, and this operation has succeeded, but more commonly has been followed by a renewal of the

\* P. 78.

† Si avec la doctrine physiologique on fait partir la guérison d'un chancre du jour où l'ulcération est cicatrisée sans s'inquiéter de ce qui reste après, elle sera quelquefois en apparence plus rapide par le traitement simple, et dans les hôpitaux, les malades seront moins long-temps en traitement, mais si pour dire un malade guéri on attend que toute induration ait disparu, on trouvera la différence énorme en faveur du traitement mercuriel.—Ricord, p. 578.



disease, so that it ought not to be employed, except where the cicatrix is small, or of a cartilagenous hardness, and moveable in the subjacent cellular tissue. The resolution however, of this induration is always tedious.

There are circumstances, however, which should induce us either to suspend the use of mercury altogether, or to lessen the quantity. In some few patients, the first influence of the mercury is on the throat and not on the gums, and in these cases, a further persistence in full doses of mercury will not only prove ineffectual for the relief of the venereal symptoms, but hazard a sloughing condition of the fauces.

From the third to the seventh day, the patient is liable to severe griping affections of the bowels, the evacuations consisting of mucous, tinged with blood. This dysenteric state requires that the mercury should be omitted, and opium or the brown mixture be exhibited.

There are two other singular affections which not unfrequently attend the use of mercury. The one is the erythismus mercurialis, described by Mr. Pearson, and the other is a peculiar eruption, which has received different appellations from the authors who describe it. Dr. Alley calls it *hydrargyria*; Dr. Moriarty, *lepra mercurialis*; Dr. Spens, *erythema mercuriale*, and Dr. Bateman places it as a variety of *eczema rubrum* in the order *vesiculæ*.

*Erythema mercurialis*, says Dr. Collis,\* is to be looked for in the early periods of the mercurial course, sometimes it scarcely attracts the attention of the patient for the first two days, and not until the uneasy sense of itching, which it excites, shall have deprived him of a night's rest, when it may be found widely spread over the limbs and body. During the earlier period of a mercurial course, therefore, we should frequently examine the surface of the body, more particularly at the angular fold of either groin, as also between the scrotum and thigh, for it is in these situations that the eruption most usually makes its first appearance, in whatever form mercury be used. On the slightest

\* P. 59.

symptom denoting the approach of this affection, the surgeon should discontinue the use of mercury, purge the patient, and should the disease advance, expose him to the open air as freely as the state of the weather will permit.

This eruption seldom continues beyond eight days, though occasionally much longer. An obvious amendment takes place in the venereal symptoms, on the first appearance of this eruption, and that in a degree more striking than that which usually attends so slight a degree of ptyalism,\* and what is most worthy of remark is, that we never find the eruption make its appearance while the system is under the influence of ptyalism; so that after we have ptyalism fully established, we may dismiss all our fears on account of this rash.† But at whatever period of a course of mercury the mercurial fever is first excited, there is danger of erythema.

Of all the dangerous effects which may result from the use of mercury on the occurrence of ptyalism, those of mercurial erythismus are the most hazardous, as well as the most remarkable. This state is characterised by great depression of strength, a sense of anxiety about the precordia, irregular action of the heart, frequent sighing, partial or universal trembling, a small, quick, and sometimes intermitting pulse, occasional vomiting, a pale contracted countenance, and a sense of coldness; but the tongue is seldom affected, nor are the other natural functions much disturbed. When these, or the greater part of these symptoms, are present, a sudden exertion will sometimes prove fatal; for instance, walking hastily across the ward, rising up suddenly in the bed to take food or drink, or slightly struggling with some of their fellow patients, are among the circumstances that have commonly preceded the sudden death of those who have fallen from mercurial erythismus.

The point at which the mercurial treatment should be stopped, when the sore heals kindly, and none of the preceding unfavourable circumstances have occurred, is much debated. Most practitioners are of opinion that

\* P. 61.

† P. 62.



the constitution should be brought strongly under the influence of mercury. Beaumès, however, recommends that on the cure of the primary sore, the mercury should be omitted, and asks, what sufficient motive is there for its continuance? This appears to be the right view of the case, for, although some constitutions are so tolerant of it, that little inconvenience results, yet, in many cases, great general irritation is excited, and consequently a great predisposition is formed, not only to the secondary symptoms, but to every kind of disease to which the constitution of the party be liable.

With respect to the local treatment of the indurated ulcer, *venerola indurata*, Beaumès states it is not so advantageous as in the unindurated ulcer, and is favourable in proportion as the induration is dissipated by a mercurial treatment. Many authorities, nevertheless still recommend cauterization, but the practice cannot be received as universal, and Ricord admits that even when the induration is of little extent, cauterization is much less efficacious than under other circumstances. All, however, are agreed that fatty substances are ordinarily hurtful in the treatment of chancre, especially mercurial ointments, “for, with some exceptions,” says Ricord, “nothing is more common than to see chancres multiply, extend, or inflame, though exempt from induration, if we dress them with mercurial ointment.” He adds, also, that mercurial ointments employed after indurated cicatrization, if they have succeeded frequently on the skin, yet more usually when applied to mucous membranes, they produce irritation, and the ulcer re-opens, so that under any circumstances, the resolution of this induration is always long and tedious.

*Treatment of the venerola phagedenica.*—Ricord divides this description of ulcer into three kinds, or the indurated phagedenic ulcer—the phagedenic gangrenous ulcer, from excess of inflammation—and the phagedenic gangrenous ulcer from debility or constitutional tendency; and each of these forms, he considers as demanding a different treatment.

In the phagedenic ulcer, the induration may so increase, as not only to oppose the formation of a cicatrix, but also to

make such compression as to produce gangrene. In this form of the disease, he recommends\* a concentrated solution of opium, and the simultaneous employment of emollient cataplasms, and antiphlogistic remedies. When the ulcer is of little extent, cauterisation, he observes, is much less efficacious than in other circumstances; but the nitrate of silver is still useful, for it modifies favourably the surface, stops often the progress of gangrene, and represses during the healing of the sore, those exuberant vegetations which have a tendency to become fungoid, and as much as mercury is hurtful in the other varieties, by so much the more, is it advantageous in this.

In the treatment of the gangrenous sore, by excess of inflammation, he tells us, we must forget the specific nature of the malady, and treat it merely with reference to this excess of inflammation, and the means must be proportioned to it. How many accidents, says Ricord,† “have we not seen arise from an empirical mercurial treatment, in these cases directed against the specific cause. Dr. Collis, also states, that attempting the treatment of such cases, by throwing in mercury largely and suddenly, he freely admits, that “with many, this practice was not successful.”

“Destructive as this form of disease is,” says Mr. Carmichael, “it will yield to the following means:—Absolute “rest in a recumbent position, venesection in proportion to “the pain, inflammation, and symptomatic fever; antimo- “nials in sufficient doses to nauseate; warm poultices of “bread and water; warm fomentations, either in the form “of a stupe, or injected between the prepuce and glans; “opium, hyoscyamus and cicuta, in sufficient doses to “lessen pain and irritation, and procure rest at night—are “the means on which I rely, during the inflammatory and “more active stage of the phagedenic ulcer. Afterwards, “when it excites but little uneasiness, and creeps slowly “along, healing in one place while ulcerating in another, “the solution of nitrate of silver, in the proportion of one,

\* P. 575.

† P. 579.



“two, or three grains to an ounce of distilled water, may be  
“of service, or the mercurial black or yellow washes will agree  
“in some cases, while in others, it must be admitted that no  
“application seems to check the progress of the ulcers.”

At this point, a spontaneous hæmorrhage, which is sometimes very profuse, often gives an immediate check to the disease; and, observing this, Mr. Carmichael has been induced, in some instances, to pare off the irregular jagged superficies of the ulcer, and to encourage the bleeding by immersing the part in warm water, and “I have had,” he adds, “the satisfaction of frequently witnessing the most  
“beneficial effects from a measure apparently severe, but  
“which was followed by a cessation of pain, and a rapid  
“amendment of the ulcer thus treated.” In other cases, when the parts are greatly swollen, and the discharge foetid, dividing the prepuce, not only relieves the phymosis, but also occasions a flow of blood to one or more points, and sufficiently abundant to afford the greatest relief. It is a point of practice, also, to divide any band of integument which may keep up irritation, and as an ulcer, no matter what its character, when it forms on the frænum, usually continues to extend till it has eaten that part through; Mr. Carmichael recommends it to be divided by a bistoury, as being generally followed by an immediate cessation of the ulcerative process.

“I have not observed any advantage to result from the use  
“of emollient, or of fermenting poultices,” says Mr. Carmichael, “to this description of ulcer. When the sloughs are  
“extensive, stimulating applications are often extremely  
“useful, such as venice turpentine, or balsam of copaiva, or a  
“lotion, composed of one part of tincture of myrrha to seven  
“of camphorated mixture, have been attended with much  
“benefit. They correct the foetor of the sloughs, and stimulate the sound parts to cast them off, but unfortunately  
“have not the power to prevent their renewal. Change of  
“air, in every instance I tried it, was attended with decided  
“advantage. I am so fully assured of the benefit to be  
“derived from this source, that the first thing I should

“recommend, on being consulted by a patient with a slough-  
“ing ulcer, would be his removal to the country.

“Bark appears to me to be injurious in this ulcer; I  
“never observed any benefit under its use, but, on the con-  
“trary, found that the ulcer always rapidly extended, during  
“its exhibition. Indeed, from the high degree of fever  
“present, we might *à priori*, conclude that bark would not  
“be serviceable. The pulse is generally 100 to 130, and  
“when the ulcers are very extensive, the tongue is dry,  
“brown, or even black, such as it appears in the advanced  
“stage of typhus fever. A contrary mode of treatment seems  
“to be indicated by the fact that a spontaneous hæmorrhage  
“from the ulcer frequently induces a favourable change.”  
The exhibition of opium or cicuta, in large doses, has  
frequently been attended with the most decidedly good  
effects.

“When the ulcer has obtained considerable ground, we  
“should entertain but a very unfavourable prognosis of the  
“event. Thus, if the ulcer had already destroyed one half  
“of the penis, the most judicious treatment will scarcely  
“save the remainder, or prevent the scrotum from falling  
“into mortification; in which case, the patient (if he can  
“think himself so) will be fortunate in escaping with life.  
“But if only a part of the prepuce and glans is engaged  
“in the ulcer, however alarming the state of the patient,  
“we may hope, under judicious management, to retrieve  
“him from his perilous situation.”

The phagedenic gangrenous ulcer, from debility, or consti-  
tutional idiosyncrasy, is that form of disease which is most  
usually contracted in hot climates, and makes such frightful  
havoc when the patient returns to the north. It is this  
ulcer which is sometimes contracted in low and damp situa-  
tions, and which is often suddenly and happily changed, by  
transferring the patient to the wards of a well-ventilated  
and well situated hospital. “In this form of gangrene, as  
“well as the former,” says Ricord, “it is a very great error  
“to fly to the use of mercury. I can affirm, with very few  
“exceptions, that nothing can be worse than mercurial



“dressings, and mercury exhibited internally in this form of  
 “phagedena. The treatment which has been most favourable,  
 “ble, has been cauterization, and dressings with aromatic  
 “wine.\* In these cases, the cauterization should be deep  
 “and repeated, and in some cases, twice a day. The dress-  
 “ings should be equally frequent, for the morbid secretions  
 “being very abundant, should be often removed. When,  
 “notwithstanding the use of the nitrate of silver, emollient  
 “poultices, antiphlogistics, narcotics, and dressings with the  
 “aromatic wine, the gangrene continues to make progress,  
 “or remains stationary, I apply a blister, or rather sprinkle  
 “the powder of cantharides over the inflamed surface, and  
 “this dressing is left on for twenty-four hours. At the end  
 “of that time, lint should be applied, dipped in aromatic  
 “wine. Under this treatment, the ulcer soon cleans, and  
 “granulations form. In some instances, however, it is  
 “necessary to repeat the sprinkling with the powder of  
 “cantharides, perhaps every three or four days, till the  
 “granulations spring up. If the disease still continues,  
 “cauterization with the *paté de Vienne* must be had recourse  
 “to, and which daily experience,” says Ricord, “authorizes  
 “me to recommend.”

*Treatment of phymosis and of paraphymosis.*—Phymosis and paraphymosis are much less frequently attendants upon chancre, than upon those ulcers which are destitute of its characteristic marks. Whenever a disposition to phymosis or paraphymosis occurs, the patient should be strictly confined to the recumbent position, and in the former case, be desired to inject warm water frequently between the glans and prepuce. Poultices of bread and water may also be applied with advantage, and antimony given

\* Ricord's formula for this infusion shows it to be a powerful stimulus; it is as follows :

Espèces aromatiques.	℥ iv.
Vin rouge .	lbj.
Alcolat vulnéraire	℥ ij.

Faites marcérer les espèces aromatiques pendant huit jours dans le vin; passez avec expression et ajoutez l'acolat vulnéraire.

in such doses as will excite slight nausea. These means are often sufficient, but when the inflammation is violent, the penis considerably swollen, and attended with acute pains, if the most active measures are not immediately adopted, the inflamed parts will fall into a state of mortification. "In these cases," says Mr. Carmichael, "the symptomatic fever may run so high, that the pulse is from 110 to 130 with thirst and restlessness. Under such circumstances, I immediately direct blood to be taken from the arm, in proportion to the urgency of the symptoms, and health of the patient, and repeat venesection every six or eight hours, until the inflammation begins to yield. It is as necessary to have recourse to the lancet in these cases, as in pleurisy, or the most acute ophthalmia. However beneficial local blood-letting may be in inflammation of other parts, it is scarcely admissible in this; for if the matter which flows from beneath the prepuce should come in contact with the wounds inflicted by leeches, troublesome sores might follow, which might still further add to the inflammation it was intended to subdue. By active measures of this kind, if employed in time, we shall avert the usual result, or mortification of the prepuce, or suppuration of the body of the penis, under its investing ligaments." In the phagedenic form of the disease, the danger is imminent, and the best surgical advice should be immediately had recourse to, and the operation, if recommended, should be at once submitted to.

*Treatment of syphilitic bubo.*—"Should buboes attend the venerola indurata, I have," says Mr. Carmichael "not found from experience that mercurial frictions will discuss them. On the contrary, the trials I have made, incline me to believe, that this medicine tends rather to increase their inflammation, and, consequently, their tendency to suppurate. But, even under suppuration, they will heal much more readily than if the patient were subjected to a strong mercurial irritation. The application of leeches and cold lotions, with attention to rest and quietness, will often succeed in discussing them. The buboes in this form of venereal disease are often re-



“markably hard and indolent, evincing neither a disposition  
“to disperse or to suppurate. In such cases, the greatest  
“advantage may be derived from the repeated application of  
“blisters to the indurated bubo, which soon either causes the  
“dispersion or the suppuration of the tumor, and thus frees  
“the patient from a troublesome symptom, which might  
“otherwise continue many months to torment him. If sup-  
“puration takes place, it is my practice to allow the tumor to  
“break spontaneously, except the patient should suffer much  
“pain before this event occurs, which often renders it neces-  
“sary to use the lancet as a means of relief.” The buboes  
which form, but in any case, have no discriminating cha-  
racter; but if the sore of the syphilitic bubo has a callous  
feel, and is either of a dark foul appearance, or of a light  
brown tawny colour, and this ulcer spreads, we may with  
confidence, have recourse to mercury, and we shall, in most in-  
stances, find that quick amendment follows its exhibition.”\*  
In general also, however, after matter has formed small doses  
of pilulæ hydrargyri have been found useful. The iodide of  
potassium has been strongly recommended in all forms of  
bubo, by many foreign writers on syphilis; but it has not  
supported in this country the reputation it has acquired on  
the continent.

#### TREATMENT OF THE SECONDARY SYMPTOMS.

If the problem of the treatment of the primary symptoms  
be difficult, that of the treatment of the secondary symptoms  
is still more so, for it is a law of morbid poisons, that their  
secondary affections do not necessarily yield to the same  
remedies as their primary phenomena. In paludal fever,  
for example, as long as the actions of the poison are limited  
to producing mild forms of intermittent fever; quina  
is a certain remedy, but no sooner are the secondary affec-  
tions established, as disease of the liver, or of the spleen, or  
else dropsy, than calomel is the specific remedy, quina  
being either injurious or inefficient. An equally remarkable  
change of treatment is required, should the poison of scar-  
latina fall on the peritoneum, or on the synovial membrane

of the joints. It is plain, therefore, that mercury, the great agent in the cure of the primary symptoms, is of doubtful efficacy in the cure of the secondary symptoms, and experience as well as analogy, have shewn that many different remedies as well as modes of treatment, are necessary to combat the multifarious diseases arising from this poison.

In the treatment, therefore, of the secondary symptoms, the early practitioners exhausted the whole pharmacopœia, and the modern French, still employ, a vast variety of remedies, so much so that Jourdan has dedicated a whole volume to their consideration, and even the formulæ of Desruelles, one of the last published works on syphilis, embrace no less than sixteen pages. The English school of medicine, however, has not been able to discover the beneficial effects of any other medicines in the cure of these forms of the disease, than mercury, sarsaparilla, and very recently of the iodide of potassium.

*Treatment of the syphilitic diseases of the skin.*—When the syphilitic poison falls on the skin, it is singular how many different diseases it excites, sometimes in the same individual, and sometimes in different individuals, by acting on different idiosyncrasies, and also how many different remedies or modes of treatment they require. In the cure then of this class of affections, we are obliged to employ all the three agents that have been mentioned, or mercury, sarsaparilla, and the iodide of potassium, and even these, are not in all cases efficient.

Of all the syphilitic papular eruptions of the skin, the *lichen syphiliticus simplex*, is the most intractable by medicine. The iodide of potassium does not appear to influence this form of disease; and when treated by mercury or by sarsaparilla, separately or together, it often continues many months. The last case I treated of this description, finding it intractable to the three great remedies exhibited by the mouth, the patient was directed to apply the liquor hydrargyri oxymuriatis, as a lotion night and morning, to the back and other part affected, and now the disease quickly subsided.

The *lichen syphiliticus agrior*, or that form of lichen which has a tendency to ulcerate, is much more amenable to



medicine, and readily yields to a gentle course of blue pill. This form of cutaneous eruption is also a little influenced by the iodide of potassium.

The *prurigo syphilitica*, is said by Rayer to require cinnaber fumigations—probably sarsaparilla is a more efficient remedy.

Of the squamous eruptions, *lepra syphilitica* is almost as intractable as the *lepra vulgaris*, and only occasionally yields to the internal use of sarsaparilla or of mercury, or of both conjoined. The liquor hydrargyri oxymuriatis, however, used as a lotion, greatly facilitates the cure.

The forms of *psoriasis syphilitica* are best and efficiently treated by dressing the part with the unguentum hydrargyri nitrico oxydi. If combined with diseased bones, the iodide of potassium must be exhibited also.

The treatment of the *exanthemata syphilitica* is, in general, extremely simple. The *roseola syphilitica febrilis* readily yields, in about a week or ten days, to the ordinary treatment of the non-specific forms of the disease, or to milk diet, attention to the bowels, and saline medicines.

The *roseola syphilitica annularis*, usually rapidly declines when treated either by small doses of mercury, or by the iodide of potassium; but the latter medicine is, from its innocuous properties, in all cases as the effects are equal, to be preferred to the former. There are cases, however, which appear to yield only to the iodide of potassium. A gentleman who had been taking small doses of the bichlorate of mercury and sarsaparilla for several weeks, applied to me, entirely unrelieved by these medicines. A course of the iodide of potassium, continued for a short time, entirely removed every vestige of the disease, except a few spots, which had previously changed to copper colour.

The *purpura syphilitica* sometimes yields to mercury or to the iodide of potassium; occasionally, however, these cases are most rebellious to every remedy, whether antiphlogistic or antisymphilitic. The last case of this description I treated, was conjoined with an intermitting roseola chronica. It resisted mercury and the iodide of potassium, and at last gave

way to a treatment of five grains of iodic acid, three times a-day.

Of the *pustular forms of the cutaneous diseases*.—Ecthyma syphilitica having the phlyzacious pustule, often yields to sarsaparilla, but appears aggravated by mercury. A case of this form of corona veneris remarkable for the success of the treatment, occurred in a patient, James Salmon, aged forty, admitted into St. Thomas's Hospital, February 12, 1840. In this instance, a pustular eruption, followed by rather deep ulceration, had appeared on the upper part of the nose, of both eye-lids, and on the lower part of the forehead. Its form was irregular, and it spread in a crescent shape, the convex line extending over the centre of the forehead, while the concave line crept along under the superciliary ridge, attacking, and threatening to destroy, both the upper eye-lids. This disease had existed about four years, and pieces of bone had come away, both during this period and previously, and he acknowledged to have suffered from primary symptoms sixteen years ago. This patient was directed to take eight grains of the iodide of potassium three times a day, and to dress the sore with the unguentum hydrargyri-nitrico-oxydi. On the 6th of April, the eruption and ulceration had disappeared, leaving behind the marks of their ravages in a puckered state of the integuments of the forehead and eye-lid with slight thickening. The local disease was, therefore, cured, and the patient's health greatly improved. At this period, however, the poor fellow fell ill of fever, of which there were many cases in the ward, and died in the first stage, covered with petechiæ.

The only vesicular form of cutaneous eruption in syphilis, is *rupia*, and this disease requires much judgment in its treatment. The other cutaneous affections little impair the general health of the patient, but the tendency of this disease it has been stated, is so debilitating, as rapidly to reduce the powers even of the strongest man. Mercury, in any form or quantity, exhibited internally, or by inunction, is, according to my experience, highly dangerous and improper. I have seen cases treated even by small doses of mercury, terminate



fatally, large doses are still more unsuccessful, and a fatal instance of this disease, so treated, occurred very lately at St. Thomas's Hospital. The party was a young woman with extensive rupia sores, for which she used mercury by inunction. At first, the sores improved, but no sooner was the system under the influence of mercury, than the disease rapidly extended, and in a few days, the patient sunk. The inefficacy of mercury in the treatment of rupia, is admitted by many eminent practitioners. Dr. Collis says :\* "The scabs and ulcers of rupia appear to be very little under the influence of mercury. I have seen this medicine administered, in cases of this affection, to patients of pretty vigorous habits, and although it acted in a most kindly manner, and produced a full and healthy ptyalism, yet it had not any effect in causing the scabs of rupia to dry up and fall off, nor did it induce in those ulcers which had been exposed by the previous removal of the crusts, any disposition to heal; the only change induced by it was to convert them into ulcers, which though florid, presented one uniform smooth surface, sunk below the level of the skin, and totally devoid of granulations, which proved very slow and difficult to heal. But the administration of mercury to patients afflicted with rupia, is worse than useless in all instances where the patient is naturally delicate, or has been much reduced and lowered by the previous disease; for in all such cases, it proves almost *invariably fatal*, by increasing the weakness and generally by inducing an incontrollable diarrhæa. It is only in a few very robust men that it could be said not to have proved highly dangerous or fatal." Mr. Carmichael also adds,† "I am satisfied there is not an experienced member of the profession who will not admit that the group of constitutional symptoms I have described in this chapter frequently resist the effects of reiterated courses of mercury."

There is one mode of treating rupia, however, which appears to be uniformly successful, or by dressing the sores

\* P. 179.

† P. 178.

with the unguentum hydrargyri-nitrico-oxydi, and by supporting the patient either by sarsaparilla or by the iodide of potassium, and the latter medicine is infinitely more beneficial than the former. A treatment by sarsaparilla is rarely alone sufficient, but it succeeds if the patient be, at the same time, supported by wine, porter, and a generous diet; yet even thus assisted, the cure is long and tedious. The exhibition of the iodide of potassium is far more efficient, and presents one of the most striking examples of the beneficial effects of this medicine. Indeed, it is quite remarkable how rapidly the emaciated and cachetic beings, who are most commonly the subjects of the rupia sore, recover their health and strength under its use, and that without the indulgence of either wine or porter, or of any other than the ordinary diet of the hospital, in which meat is allowed only every other day.

Still, neither sarsaparilla nor the iodide of potassium, although so singularly successful in restoring the health of the patient, possess the property of healing the rupial sore, and for this purpose, a local dressing of mercury is essentially necessary. At the same time, then, that the one or the other of these medicines is exhibited, it is proper the scab having first been removed by a poultice, to dress the sore with the unguentum hydrargyri-nitrico-oxydi. The application of this powerful ointment is universally successful, for it not only heals the sore, but so much of it is absorbed without affecting the constitution, as prevents the formation of fresh vesiculæ. The effects of the combined action of the unguentum hydrargyri-nitrico-oxydi, and of the iodide of potash in curing this disease, are strikingly instanced in the following case:—

George Tovey, a waterman, affected, four years ago, with primary symptoms, was admitted into St. Thomas's Hospital, with many rupial sores on his legs, and as is sometimes the case, one had formed on the inner membrane of the upper eye-lid, while a large and painful node was seated on each tibia. It is impossible to conceive a more emaciated, cachetic, shattered frame, than was presented by this indi-



vidual; he was in a state of confirmed hectic, perspired profusely, and was fast losing the little blood he had left, both by the bowels and by the nose; his mouth, also was still sore, his teeth loose, and his breath most offensive from the mercury he had recently and most unsuccessfully taken. Under these unfavourable circumstances, eight grains of the iodide of potassium were prescribed, three times a-day, and in a month, his pains were gone, the nodes had disappeared, many of the rupial sores had healed, and so rapidly had he recovered his health and strength, that he was now the stoutest and healthiest man in the ward.

But although this patient's health had been so favourably and suddenly changed, still there were many rupial sores, and especially that on the eye-lid, altogether uninfluenced by the treatment. It became, therefore, necessary to apply a dressing of the unguentum hydrargyri-nitrigo-oxydi, and by this application, every trace of rupia disappeared. This patient afterwards suffered from affection of the throat, and also of the bones of the nose, notwithstanding he was still taking the iodide of potassium, so that he was long under my observation, but had no return of the rupial affection. This rapid restoration to health, in rupial cases, from the exhibition of the iodide of potassium, is so constant, as to render it quite certain that the effect is not accidental, but a consequence of the remedy, and a law of the disease.

The effects of this treatment may be still further illustrated by the following case. A stout woman was admitted into St. Thomas's Hospital, with three large rupia sores on her head. She had been treated by sarsaparilla and by small doses of blue-pill; under these remedies, the sores had been so little benefited, that one had been lanced, and beneath it the outer table of the cranium, could be felt extensively ulcerated. The treatment by iodide of potassium, and the unguentum hydrargyri-nitrigo-oxydi was adopted; two of the rupia sores healed immediately, and, at length, the ulcerated portion of the outer table became fixed, and the patient recovered without exfoliation.

The *tubercular syphilitic eruptions*, readily yield either to

small doses of mercury, or to the iodide of potassium, but more certainly to the former. The broad tubercular eruption, or tubercula syphilitica plana, is often intractable, especially when it ulcerates. In these cases, an ointment of the iodide of potassium, a drachm to the ounce, or the unguentum hydrargyri-nitrico-oxydi, are useful applications, but under every mode of treatment, the cure is long and protracted.

The *herpes preputialis* yields to any slight astringent lotion, as a solution of half a grain of acetate of lead to an ounce of water, or to an application of zinc ointment.

For the cure of the *cutaneous excrescences* or growths, the remedies are almost as endless as the forms of disease. They may be removed by the knife, ligature, or cauterization, or they may be destroyed by savin powder, by the liquor plumbi acetatis, by the tinctura ferri muriatis, the liquor hydrargyri oxymuriatis, or by acetic acid. The iodide of potassium, as also mercury by inunction have also been found useful in dispersing these adventitious growths. Ricord says :  
 “ Quel que soit le siège du tubercle muqueux, anus, vulve, pli  
 “ génito-crural, intervalle des orteils, aisselles, en même temps  
 “ qu’on administre le traitement général qu’il réclame comme  
 “ accident secondaire, la médication locale, vraiment spéci-  
 “ fique par la rapidité de ses résultats, est la suivante.

“ D’abord on lave les parties malades, si elles ne sont  
 “ point ulcérées avec du chlorure d’oxyde de sodium pure, et  
 “ dans les cas contraires ou de trop vive irritation, étendu  
 “ d’eau, de manière à déterminer une légère cuisson sans  
 “ douleur. Puis après les lotions répétés deux fois par jour,  
 “ on saupoudre les parties malades de calomel anglais.  
 “ Huit ou dix jours suffisent pour faire disparaître des  
 “ masses énormes de ces éruptions qui, souvent placées  
 “ entre les orteils, empêchaient les malades de marcher  
 “ depuis plusieurs mois.”\*

*Treatment of the syphilitic affection of the bones.*—The treatment of the affections of the bones and of the periosteum, has hitherto been the “questio vexata” of syphilis. Some pathologists have contended that this class of disease

\* P. 635.



will spontaneously heal under a simple antiphlogistic diet and treatment, but there is no sufficient evidence of this assertion. So little tendency, indeed, does there appear to a spontaneous termination, that it was formerly the practice to send patients to the West Indies, and to place them under the care of the natives of those countries. Long intervals, also, are frequently found to have elapsed, especially in seamen, from the first commencement of the disease, before any medical treatment has been employed, and yet without any mitigation or appearance of subsidence of the symptoms. The affections of the bones of the nose, and of the palate are seldom painful, and the applications for advice in these cases are consequently often long delayed. But the longer the delay, the more aggravated the disease, and the greater the chances of exfoliation and disfiguration. It must be concluded, therefore, that without the aid of medicine, the number of victims from this class of disease, would be distressingly large and their sufferings indescribably severe. Happily, however, we are provided with efficient remedies against these great evils in mercury, sarsaparilla and more especially in the iodide of potassium, and it will be seen that all these remedies are necessary in the cure of diseases of the bones.

In the cure of the hard periostial node, the properties of sarsaparilla are so doubtful, that its exhibition in these cases is generally abandoned as useless and inefficient. It is admitted, however, that many cases of hard nodes will yield to mercury, when given in such doses as to affect the system. Still there are many others, in which this metal produces no such successful result, for although the patient is generally relieved as soon as ptyalism is established, yet the pathological state of the part often remains unchanged so that on the salivary discharge ceasing, the pain returns, and the patient is doomed to many years excessive suffering, or only relieved during the time, that he is under the fullest influence of mercury. It is painful even to reflect on the ceaseless agony under which these patients have been often seen to suffer. "Pain," says Mr. Carmichael, "is a mild term to express their tortures." It is impossible, with any accuracy, to determine the number of cases in which mercury is ineffi-

cient, but it must be large. Ricord states that "mercury  
" only occasionally useful in the primary affection, is incon-  
" testably so, in the secondary affections, or those of the  
" skin, and again loses its curative properties in the tertiary  
" accidents or those of the bones." This, perhaps, is in excess,  
but so many cases have at all times been hopelessly treated  
by mercury, that there is no surgical writer on syphilis,  
from Ambroise Paré to Desruelles, who has not proposed  
cutting down on the intractable node and destroying it either  
by actual cautery, or by the hammer and chissel. New  
experiments were, therefore, necessary to determine a more  
efficient treatment of this affection, and the discovery of the  
virtues of the iodide of potassium, as its surest antidote,  
forms an epoch in the history of syphilis.

Isaac Chilton was admitted into Saint Thomas's Hospital,  
the 17th January, 1831, with large and extremely painful hard  
periosteal nodes on each tibia. His sufferings had been long  
and severe, and his health greatly impaired. The first medi-  
cines prescribed for him were mercurial, and he was salivated;  
but his pains returned as soon as his gums had healed. A  
decoction of *smilax aspera* was then tried, but without  
success. On the 7th of April, therefore, a decoction of  
*sarsaparilla* was substituted, and was taken till the 2nd June,  
a period of near eight weeks; but without producing the  
slightest alleviation of his sufferings. On the contrary,  
the bones of the phalanges of the second and third finger of  
one hand inflamed, and necrosis resulting, one finger  
was obliged to be amputated, and this untoward event took  
place, notwithstanding the application of leeches and a  
variety of other local treatment.

The parts having healed, new experiments became neces-  
sary to save the other finger, which seemed to be fast  
running into a similar case of necrosis. On the 2nd July,  
therefore, or not until nearly six months had passed in  
fruitless attempts to relieve him by other methods, five  
grains of the iodide of potassium, out of camphor mixture,  
three times a day, were ordered for him, and this quantity  
was gradually increased till, at the latter part of the treatment,  
it amounted to ten grains. The effects of this medicine were



most happy ; in a few days, his pains were relieved, and then ceased altogether, the nodes of the tibia subsided, and the threatened finger was saved. This patient, though he now rapidly recovered from the affection of the long bones, subsequently laboured under iritis, ulcerated throat, disease of the bones of the nose, disease of the skin, and also of the ligaments and synovial membranes ; so that he continued in Saint Thomas's Hospital, for more than a twelvemonth, and what then appeared remarkable, without any return of the periostitis.

The treatment of this case had hardly terminated, when the coachman of a member of parliament was admitted into St. Thomas's Hospital, with an exactly similar state of the phalanges of the fingers, and also of the tibia. He had been unsuccessfully treated for many weeks by mercury and sarsaparilla, and was so reduced by constant suffering, that his family thought his death inevitable. I had the option of treating this patient at his own home, but as the case appeared full of difficulty, and the previous one afforded no sufficient assurance of a successful issue from the exhibition of the iodide of potassium, I thought it better to treat him at the hospital to cover the chances of failure. Eight grains of the iodide of potassium, were prescribed for this patient in the first instance, out of camphor mixture, three times a day. The same favourable result, happily, ensued in this as in the former case, and in two months he was discharged cured, nor has he since suffered the slightest relapse.

The sudden cessation of the periostitis in the first case, was remarkable ; but it might have been spontaneous, and not the result of the exhibition of the iodide of potassium. A second successful case, however, appeared to establish a connection between that medicine and the hard periosteal node, and the practice has been subsequently repeated with the same fortunate result in so large a number of similar instances, certainly not less than two or three hundred, that it appears to be clearly and irrefragably demonstrated, that this salt is the great specific remedy in the cure of this form of secondary syphilis. Indeed, the action of quina in the cure of ague is hardly more certain or more striking than the benefi-

cial effects of the iodide of potassium, in the cure of the hard syphilitic node. Its effect, in the large number of cases that has been mentioned, have been with only one exception, to remove the pain in a very few days, and if the node be recent and the parts not extensively disorganised, to permanently cure the patient. It is only in the old chronic node, and when extensive morbid growths have formed, and such as we may now reasonably hope never to witness again, that the iodide of potassium has failed in effecting a permanent cure. In these cases, mercury is equally inefficient as a curative remedy and never affords the relief, which the patient, in every instance, receives by the iodide of potassium, and which generally lasts for a considerable time.

On comparing this new mode of treatment with that by mercury, it has these advantages. The relief from pain by mercury is seldom complete, till the mouth is fully affected; while under the use of the iodide of potassium, the patient is usually free from pain, in three or four days, and almost constantly so, within a week. Again, mercury often appears to aggravate the disease, and always impairs the constitution. On the contrary, the iodide of potassium has in no instance proved injurious, and the rapidity with which many of this class of patients increase in flesh and strength under its use, is quite remarkable. The iodide of potassium, also, is useful in a much larger number of cases, and effects the cure, without that train of disgusting circumstances, which accompanies ptyalism, or that enlargement of the cervical glands, which is so common when mercury is used. The absorption also of the morbid growth is more certain, and the frequency of relapse diminished, while the cure is obtained in a much shorter time, and consequently at much less expence to the patient, both of his constitution and of his purse. On all these grounds, therefore, the iodide of potassium must be considered as infinitely superior to mercury, in the cure of this once formidable disease.\*

\* Mr. J. M. Ferrall first medical adviser to St. Vincent's Hospital, says in a clinical lecture, "I availed myself of the opportunity to test, for your instruction, the comparative merits of the several modes of



The iodide of potassium has been given in doses of fifteen, twenty and even thirty, or more grains; but this is in excess, and generally produces head-ache, vomiting and purging. Some constitutions, on the contrary, are offended even by one or two grains. The average dose, therefore, of “treatment recommended for the cure of this disease (periostitis). These “are the treatment by free incision, by mercury and hydriodate of potash.

“As regards the immediate relief of pain, there can be no doubt that “incision, when it succeeds, has greatly the advantage of the mercurial “treatment. The merit of having insisted on this practice in periostitis, “is due to Sir Philip Frampton, whose excellent practical paper on this “subject, you will find in the first volume of the Dublin Hospital Reports. I say, *when it succeeds*, for some of the cases to which I allude are indicative of its uncertainty, except where the surgeon has an “opportunity of employing it in the early stage. In one of his cases, in “which incision was followed by immediate relief to the part incised, “the disease attacked the periosteum immediately below the point of “incision within a week from the first operation. A new incision was “now made to relieve the latest point of attack, and relief followed as “before; but before this last wound was healed, an attack of pain which “was only relieved by a nightly dose of opium, occurred in the seat of “the original incision. In another of his cases, repeated by the late “Professor Todd, but which was of longer duration, the incision was “followed by partial relief, and the patient, a lady, left town suffering “severe pain, occasionally afterwards in the country.

“The hydriodate of potash is generally capable of controlling the morbid action and relieving the pain in a shorter time than I was prepared “to expect. The fifth or sixth dose will, in the majority of instances, enable the patient to sleep, and I have known many instances, where the “third or fourth dose has produced this effect, I have notes of cases “among our out patients, who slept the first night, having taken during “the morning and the day, four doses. There is very little difference, “therefore, in the period at which the pain may be relieved, and when “you consider, that the iodine treatment avoids a painful, though brief “operation, and is not followed by an open sore, I think you would prefer, in your own instance, giving it a previous trial.

“The second ground of preference, namely, the earlier period at which “the patient can resume his occupation, is clearly on the side of the iodine, “for the case treated by mercury, occupied thirty-seven days, that by “incision, twenty-eight days, and that by the hydriodate of potash, “thirteen days. In the two latter cases, matter had formed beneath the “periosteum, and this circumstance while it accounts for healing after “incision, being a few days slower than in the first case of Sir Philip Frampton, gives an additional value to iodine, for it displays its power

the iodide of potassium has been found to be eight grains, three times a day, and even this often causes three and four motions in the twenty-four hours. A smaller dose can hardly be recommended, for the patient's intense sufferings, require immediate relief, and, consequently, we ought to begin with as large a dose, as his stomach will probably bear. Eight grains is a mean dose for an adult, and usually gives relief in three or four days, and is, therefore, plainly efficient. Some practitioners are in the habit of adding half a grain to one grain of iodine, to the iodide of potassium. But supposing iodine to act in proportion to the quantity absorbed, and not by its mere acridity, this is a great medical error; for it disorders the stomach without, in any sensible degree, benefiting the complaint. It is determined, for example, that the iodide of potassium contains three fourths of its weight of pure iodine, so that a patient taking 28 grains of the former, in the course of twenty-four hours takes no less than 21 grains of the metal. The addition then of  $\frac{1}{2}$  a grain, or a grain in the twenty-four hours of the pure iodine, is so trifling that it may be neglected, while its acridity is so great that Mr. Stone of Christ's Hospital, formerly assistant apothecary of St. Thomas's, stated to me, he was called to prescribe for ten patients, taking the compound of iodine and of iodide of potassium for one that was taking the last medicine only.

The modes of action of iodine cannot, of course, be ascertained; but it is absorbed and perhaps has an affinity for the syphilitic poison, which it modifies and deprives of a part of its power to inflict disease. Metallic iodine is supposed to be taken up by the lymphatics as hydriodic acid, the metal combining with the hydrogen of the fluids in the stomach.

“over the disease, even when advanced to suppuration, and its capability  
“of curing it in a shorter period.

“With respect to the comparative subject of the three modes, you will  
“remember, that some degree of constitutional disturbance followed the  
“incision, and that ulceration of the cheeks and diarrhæa succeeded to the  
“mercurial plan. Among the consequences of the use of the hydriodate  
“of potash, none have occurred under my observations at so early a  
“period, as to oblige us to desist, and if gastric irritation should occur,  
“which never happened in any instance, where it was used for periostitis,  
“tis, it is very easily removed.”—Medical Gazette, April 10, 1840.



The iodide of potassium is probably absorbed in substance, and so rapidly, that iodine may often be detected in the urine, within ten minutes after the patient has swallowed it. It is found also in the saliva, in the tears, in the milk and probably in the other secretions of the body; but it has not been satisfactorily demonstrated in the blood, being either so rapidly removed as to exist only in quantities too minute for detection, or else, perhaps, resolved into its elements. The time that it may be detected in the urine after it has ceased to be exhibited, is not yet determined, but in two cases no trace remained after forty-eight hours. It is remarkable that iodic acid, though a solid substance, is not detected in the urine, even after having been exhibited in the dose of 6 or 8 grains, three times a day for a considerable length of time; pointing either to a singular elective affinity of the lacteals for different medicinal substances, or supposing the medicine to be absorbed, proving that it must be removed by some other organ or tissue than the kidney and bladder. The iodic acid likewise has no similar property of curing the syphilitic node with the iodide of potassium. The best test for the iodide of potassium in the urine, is first to add, a solution of starch, and then a small quantity of a solution of chlorine. This latter agent immediately setting free the iodine, and producing the usual beautiful violet or indigo tint.

The quantity of the iodide of potassium, necessary for the cure of the hard node is very various. Some patients freed from their pains, ask to be dismissed at the end of a week, or before an ounce can have been taken. In general, perhaps, a month is about the average time of treatment, and the quantity necessary from four to six ounces. When mercury has been previously and unsuccessfully used, the quantity is often much greater, as in the following case.

A young man, William Green, was admitted into St. Thomas's Hospital, 8th May, 1834, having been affected with primary symptoms four years ago. He had a large node on the frontal bone, and another on the radius of the right arm, was much reduced and appeared to suffer greatly. For these symptoms, he stated he had been salivated no less than five or six times. Eight grains of the iodide of potas-

sium out of camphor mixture were ordered for him three times a day, and with such success, that on the 14th of June, the node having disappeared, and his health apparently perfectly restored, he was discharged at his own request.

On the 20th of August, however, he again applied for admission, the frontal node having again formed accompanied with so much effusion, that the tumor was as big as a hen's egg, so large, indeed, as to render it impossible for him to wear his hat. By his own desire, the iodide of potassium was again ordered, "for it always did him so much good," and on the 9th of October, he was again discharged without a vestige of disease.

In a few weeks, he was again admitted; a node having formed nearer to the vertex, and which had suppurated. It was now attempted to cure the disease by sarsaparilla, which was continued for a fortnight, but without any alleviation of the pain or other improvement, when he again so earnestly begged for the iodide of potassium, as "the only medicine for him," that it was again prescribed, and in three or four days, the pain had once more subsided, after which the pus was absorbed, and the node disappeared, so that he was again discharged at his own request. This patient was once more admitted into the hospital, with severe affections of the synovial membranes, for which small doses of the *pilulæ hydrargyri* were prescribed, but with so little benefit, that he again asked for the iodide of potassium, which once more restored him, and there is every reason to believe that he has had no return of these complaints. In this case, the disease was probably aggravated by the previous mercurial treatment, and more than 1lb. weight of the iodide must have been taken before this man was perfectly restored.

The quantity of iodide of potassium, therefore, necessary for the cure of the node, is, probably, in proportion to the pathological state of the parts. If the node, for instance, be recent, and the deposit as yet membranous, it is, in almost every instance, removed by a few doses of the iodide of potassium. If it has become partially ossified, it may, perhaps, even now be removed by a still larger ex-



hibition of the same remedy. But when the node has become an integral part of the bone, its removal must be almost impossible by any quantity of the iodide of potassium, or by any other mode of medical treatment. Those cases in which the node is not absorbed, are those which are most liable to relapse; for the node, like all newly formed parts, possesses a feeble vitality, and, consequently, runs into diseased actions on very slight causes. The iodide of potassium, however, possesses the property of speedily relieving these cases, and the patient remains well until some new cause again arouses the disease. It is a singular law of the hard node, that although it is often permanent on the lower extremity, and sometimes resists every mode of treatment, yet it appears to be universally absorbed on the cranium, and also on the radius and ulna,—a kind provision of nature, to preserve unimpaired the part and the limb, the most important in all the uses of life.

The hard node sometimes suppurates, and this form of periostitis was formerly frequent. This change in the pathological state of the parts requires a different treatment, and demonstrates the truth of the remarkable law, that when inflammation terminates in abscess, the remedy which, timely administered, would have prevented so untoward an event, now loses all its power over the disease, and even aggravates the symptoms. As soon, then, as the node runs into suppuration, mercury ceases to be in any degree beneficial, while sarsaparilla seems to be the specific remedy.

Joseph Keaf was admitted into St. Thomas's Hospital, December 28th, 1826, with large hard periosteal nodes on each tibia. He was greatly emaciated, his whole appearance haggard, and he seemed worn down with suffering. It was attempted to relieve this patient by repeated blisters to the nodes, and by the warm bath, and by opium, but without success. The *pilulæ hydrargyri* were now prescribed, and subsequently the *linimentum hydrargyri* was liberally rubbed on both his legs, so that he was salivated; still there was no mitigation of his pains, except during the short period his mouth was sore. The nodes now suppurated, and the sharp edge of a deep ulcer could be distinctly felt on each tibia. The

mercurial treatment having failed, the infusion, gentianæ comp., and then the sulphate of quina were prescribed, with an intention of supporting the patient's strength; but under these remedies, fever came on, his tongue was white and croated, and his life seemed in much danger. This patient had now been under a varied, but unsuccessful treatment for nearly six months, when, on the 5th of June, 1827, the decoction of sarsaparilla was prescribed for him; and by the continued use of this medicine, his pains subsided, the ulcers healed, and he was discharged, cured, in little more than two months, from the time the sarsaparilla was first exhibited.

Cases of suppurating nodes are now rare, and when they have occurred, I have most commonly treated them by sarsaparilla, in order to demonstrate this property to the pupils. It is desirable, however, to determine the relative powers of sarsaparilla and of the iodide of potassium in these cases, and it is probable, the latter remedy will be found as efficient as the former. One refractory case was, however, treated unsuccessfully at St. Thomas's, by the iodide of potassium. It was that of a young man, of exceedingly intemperate habits, with suppurating nodes on the tibia, and whose forehead was covered with pustular ecthyma. The decoction of sarsaparilla was prescribed for this patient, and the node twice granulated up, so as to be hard, but his intemperate habits could not be restrained, and after each excess, they as often relapsed. The iodide of potassium was now substituted for the sarsaparilla, and the ulcer once more granulated; but, at this point, he was discharged, for repeated acts of drunkenness and misconduct.

The *hard cranial node*, although having the same external characters as the hard node on the long bones, it has been shown is of an entirely different structure, and, consequently, some doubt might be entertained whether the same medicinal agents would be found equally beneficial in this class of cases. Experience, however, has shown, that in the cure of the cranial node, they have exactly the same powers. Mercury often removes them, but they often suppurate, and have a great tendency to relapse under that treatment. The iodide



of potassium, however, gives more certain and quick relief, more readily occasions absorption, and, perhaps, when mercury has not been previously administered, the node seldom or never runs into suppuration. When the cranial node has ulcerated, sarsaparilla takes up the disease, and the ulcerated bone heals under its influence. A case, lately treated, is a remarkable instance of this property. A young man, John Ingram, was admitted with an exfoliation of the outer table of the right parietal bone, of at least the size of half-a-crown, yet, in the course of three months, under a treatment of sarsaparilla, although the parts were not restored, the wound had perfectly cicatrized, and the disease had terminated.

The following case will show, that when the hard and ulcerated nodes are combined, that sarsaparilla, while it heals the former, is unequal to the cure of the latter, and that the iodide of potassium then exerts its usual powers.

A young man was admitted in St. Thomas's Hospital, whose head, in addition to two ulcerating nodes on the frontal bone, was actually deformed by the great amount of hard deposit under the integuments on both sides, and which, on the right side, had rendered the temporal fossa greatly convex. The ulcers readily healed under the treatment of sarsaparilla, and the head was something reduced in size. The progress of the case, however, was so slow, and the pain so severe, that the iodide of potassium, was at length given, in combination with sarsaparilla. The pain was, as usual, relieved in a few days, and his head was reduced to nearly its natural size and shape, when he requested to be discharged, being capable of pursuing his usual avocations.

Syphilitic inflammation of the substance of the long bones may exist per se, or may co-exist with the hard periosteal node. It has no diagnostic symptoms by which it can be distinguished from the hard node, except, perhaps, that the bone is more generally enlarged, the pain greater, and the disease more intractable, as long as the inflammation is limited to the superficies of the bone, or to some modification of the medullary matter, or even when the ulceration is limited to the superficies, it probably yields, either to mer-

cury or to the iodide of potassium. When, however, an abscess forms in its substance, exfoliation must of necessity take place; all specific remedies lose their power, and opium is the only mode of procuring relief. As soon, however, as the bone is detached, sarsaparilla appears to facilitate the formation of healthy granulations, and under its use, the part heals.

The soft, gelatiniform or *gummy node*, is a disease of much less frequent occurrence than the hard or even the suppurating node, and is indeed but rarely seen. This node, which is an infiltrated cyst, attached, in all its periphery, to the surrounding parts, is of exceedingly chronic growth, and forms without pain. It at last ulcerates, and this ulceration is often of great extent, beginning at the centre, and extending to the circumference, and does not cease till the entire cyst is destroyed, when granulation takes place, leaving a deep, hard, cicatrix. These nodes are rarely cured by general treatment, and neither mercury, nor sarsaparilla, nor the iodide of potassium, satisfactorily influence them. Cullerier has proposed, while they are yet incipient, to attack them by blisters or a caustic solution, and states he has often succeeded. Ricord also praises this mode of treatment.\* One patient, who lost the use of his right arm from pressure on the nerve by one of these tumors, mentioned that his sister had been operated on for a node similarly situated, and that she had died.

When the syphilitic poison has fallen on the *bones* of the *nose, palate* or *face*, neither mercury nor sarsaparilla, though continued for many weeks, have appeared, in many cases, to interrupt the course of the disease, or to prevent exfoliation. In others again, in quite the incipient stage, the iodide of potassium has often fixed the already loosened bones, and cured the patient. As a general rule, however,

\* This author gives two singular cases of the formation of these tumors in the substance of the tongue. The patients relapsed, both of them, three times, and each relapse was at an interval of five or six months. The tongues, he says, resembled a bunch of nuts, and the ulceration was frightful, and might have been mistaken for cancer, but both patients were ultimately cured.



in the advanced stage, this medicine, although it improves the general health, has no power over the part affected; it is necessary, therefore, to combine with the general treatment, a local dressing. When the bones of the nose are affected, the iodide of potassium should be exhibited in the usual manner; but, at the same time, the black wash should be injected twice or thrice a-day up the nostrils; or, what is better, the interior of the nose should be anointed with the unguentum hydrargyri-nitrico-oxydi, as far as the probe can reach. This mode of treatment has been uniformly successful, and in every case I have seen, stopped the disease, and saved the nose. When the bones of the palate are affected, the general and local treatment is the same, but the unguentum hydrargyri-nitrico-oxydi should be applied more cautiously to the ulcerated part, on account of its being readily removed by the tongue.

*Treatment of syphilitic angina.*—In treating ulceration of the soft palate, tonsils and pharynx, many patients recover by the use of moderate doses of mercury, as of the pilulæ hydrargyri gr. v., bis. vel. ter. die., or by sarsaparilla. But there are also many cases which are not treated successfully by either of these remedies, however judiciously exhibited, the disease running on to deep and extensive ulceration of the pharynx, terminating, perhaps, in the loss of the uvula, or of a considerable portion of the hard and soft palate, and occasionally destroying the patient. The following case is by no means a solitary instance of this untoward result.

F. Johanson, a German, was admitted into St. Thomas's Hospital, 4th February, 1830, with rupial sores, diarrhæa, and most extensive ulceration of the fauces. The rupial sores were quickly healed by a dressing of the unguentum hydrargyri-nitrico-oxydi, and the diarrhæa was stopped by opium. The ulceration of the throat, however, though for a time stationary, at length spread in the most formidable manner, and to remedy this most threatening evil, the following medicines were in succession tried. The decoction of sarsaparilla with extract and dilute sulphuric acid, the decoction of smilax aspera; then the pilulæ hydrargyri in small

doses, but continued till his mouth was sore ; the iodide of potassium, quina, the infusions of calumbo and of canella, also many metallic substances, as the sulphate of iron, the liquor arsenicalis and the oxide of platina, but all were equally unsuccessful ; many different local applications were likewise tried, as the linimentum æruginis, mercurial fumigations, gargles of the chloride of soda, and of the nitric and muriatic acids. He likewise received a liberal supply of wine and porter, indeed every indulgence which the London hospitals so bountifully afford ; but notwithstanding these endeavours to save this patient, he died on the 3rd of April, 1831, having lingered a period of fourteen months.

The want of success in treating these severe affections of the throat, in which the uvula is often so rapidly destroyed, and such extensive ulceration occurs at the back of the pharynx, by general remedies, rendered it desirable to try the effect of a local application of mercury, direct to the part, in order to determine whether it followed the law of the rupia sore. Isaac Chilton was treated in this manner. This man, immediately after the affection of the bones had subsided, under the use of the iodide of potassium, was attacked with ulceration of the throat, so rapid and extensive as once more to threaten his existence. All ordinary means having failed to arrest this disease, he was directed to anoint the part with unguentum hydrargyri fortius, night and morning, and the throat immediately granulated, and in a few weeks he recovered.

The success of this case has led to further experiments with the mercurial ointments, and it has been found that not only may the unguentum hydrargyri-nitrice-oxydi be used in moderate quantity with safety, but even with much greater advantage than the unguentum hydrargyri fortius. No case, perhaps, can instance the efficacy of this treatment in a more remarkable degree than the following.

A coachman upwards of six feet high was brought into St. Thomas's Hospital, so emaciated, with a voice so sepulchral, a countenance so sunk, and with such general lividity, that at first it was imagined he was labouring under cholera.



On examining him, a large and frightful ulcer, which had destroyed all the soft palate and a large portion of the hard palate, was seen spreading in every direction, as far as the eye could reach, and covered with a dirty ash-coloured slough; his legs were also greatly œdematous. He stated he had been for two years under every variety of treatment, and was at length wandering in despair, he knew not whither. In this state, he was seen by the porters on London Bridge, and brought to the hospital. Many doubts were entertained whether, in his emaciated and shattered condition, he could survive ten days, so as to allow time for medicine to act. Some few ounces of wine, however, with sago, were ordered for him, together with that now well-known restorative to the general health in these cases, the iodide of potassium. He was, likewise, directed to anoint the throat with the unguentum hydrargyri-nitrico-oxydi, night and morning. The effects of this treatment were most striking. In a few days, the throat put forth healthy granulations; he was shortly afterwards able to walk about the ward; the swelling of his legs subsided, and in a few weeks, he was discharged at his own request. This person was lately seen at the hospital asking for advice for his wife, when he stated he had continued perfectly well.

Not only will the deep eating ulcer heal under this local treatment, but also the superficial and intractable serpigenous ulcer. A gentleman, who had been for some weeks rubbing in mercury and taking the iodide of potassium for this affection, without success, was directed to omit all general remedies, and to apply the ointment; he did so, and was cured in a few days. The best mode of applying the ointment, is by a piece of lint attached to the end of a pencil. The number of cases thus treated has been considerable, and quite sufficient to establish the great value of this treatment. As a general principle, it is seldom that mercury applied in this manner, affects the mouth, but in two or three cases, it has been impossible to prevent this action, and in each case, there was an immediate extension of the pharyngeal ulceration, shewing that the amelioration is occasioned by

the local stimulus, and not from any constitutional affection of the system.

The syphilitic poison often endangers vision by producing inflammation of the iris, the conjunctiva, or the cornea. This opthalmia most commonly accompanies or immediately follows the cutaneous eruption, is rarely an isolated secondary symptom, and may produce the entire destruction of the organ of sight. In the cure of these forms of syphilis, mercury is the great specific and only remedy, and must be rapidly pushed so as to affect the mouth, ptyalism being the only means of saving the affected organs. Neither sarsaparilla nor the iodide of potassium have the slightest influence in controlling these diseases, for they often occur when these medicines are still being exhibited for the cure of other of the secondary affections. The following case will shew the total inefficacy of the iodide of potassium in iritis.

John Cushion was admitted into St. Thomas's Hospital, 13th November, 1834, with a syphilitic papular eruption, and an exceedingly painful node on the right tibia, causing œdema of the whole leg; the periosteum of both ulnæ was also similarly affected, and there was much pain and tenderness over the whole scalp; and to these symptoms were added a slight inflammation of the conjunctiva of both eyes. This patient, it is remarkable, had taken no other medicine than a small quantity of epsom salts for the cure of the primary ulcer, and which, under this simple treatment, rapidly healed. As the affection of the osseous system was the most pressing, the iodide of potassium was prescribed in eight grain doses, and the affection of the eyes neglected. Under that medicine, the nodes disappeared, but the inflammation of the eye continued to increase, till the iris became affected, when the pain and intolerance of light was so great, that it was at length necessary to abandon the treatment by the iodide of potassium, for that of mercury. Five grains of calomel were, therefore, prescribed every night, and in a few days his mouth became affected, the iritis yielded, and he was shortly discharged, cured.



There is no circumstance in the range of medicine which shews so distinctly the impossibility of controlling the latent actions of poisons, as the syphilitic affections of the eye; for cases have frequently occurred in which the gums have scarcely healed after a course of mercury, for the cure of some cutaneous eruption or other secondary symptom, than iritis has appeared, and that formidable disease has only yielded by again inducing the freest ptyalism. In every case, therefore, of acute syphilitic ophthalmia, mercury should be given in such quantities as to ensure the patient's mouth being affected in a few days. For this purpose, two grains of calomel twice or thrice a day, or five grains of calomel every night, are in general sufficient. Some authorities prefer the proto-ioduret of mercury, to calomel; but it seems unimportant by what means salivation is produced. When the mouth is affected, the pain and inflammation in general subside. In a few cases, however, a considerable chronic conjunctivitis remains, which is best treated by the unguentum hydrargyri-nitrico-oxydi, applied locally to the eye.

Many writers recommend, in addition to mercury, that blood-letting, both locally and generally, should be had recourse to, and that to a large amount. But this practice appears altogether unnecessary, and must, in many cases, be highly injurious by favouring the action of the poison on a debilitated system. Blisters have also been recommended, and are occasionally of service, but are seldom essentially necessary. The circumference of the orbit is, by many practitioners, rubbed with belladonna ointment, and also the mucous membrane of the nose, but there is seldom any necessity even for this application.

When the ophthalmia is chronic, an alterative mode of treatment is often sufficient. A gentleman whose sight was considerably impaired, by the deposition of a considerable quantity of lymph on the cornea, was directed to take five grains of pilulæ hydrargyri every night, and under this treatment, the nebulæ in a few days disappeared, although the constitution was not in the slightest degree affected.

When the poison falls on the *ligaments* and *synovial*

*membranes*, these diseases are, in all cases, of obstinate cure, and it is difficult to determine whether they yield more readily to small doses of mercury, or to the iodide of potassium. The latter, however, should be first tried. One gentleman, who has paid much attention to the effects of the iodide of potassium in these cases, says, "Respecting the treatment of the affections of the ligaments, with considerable pain and swelling of the joints, very much resembling rheumatism, the iodide of potassium is an invaluable remedy. It produces good nights' rest, reduces the swelling, and promotes the general health." In the foul wards, the patient often asks for it, and it is frequently successful.

*Dietetic treatment.*—Mr. Hunter taught that "the manner of living under a mercurial course, need not be altered from the common, because mercury has no action upon the disease, which is more favoured by one way of life than another. Let me ask any one," he adds,\* "what effect eating a hearty dinner or drinking a bottle of wine, can have over the action of mercury upon a venereal sore, or to make it affect any part sensibly. In short, I do not see why mercury should not cure the venereal disease under any mode whatever of regimen or diet."

This was the doctrine of the dietetic treatment of syphilis until the fact of the spontaneous cure of the primary sore was first observed in Portugal, and experiments were made to obtain the same result in this and other countries. It was then found that a dietetic treatment, so much overlooked by Mr. Hunter, greatly influenced the result, and that the healing of the primary sore, by the unaided efforts of nature, is hardly to be obtained, unless by adopting an exceedingly severe regimen, or the "*cura famis*." The influence of a dietetic treatment is, therefore, strongly marked in the cure of syphilis.

The "*cura famis*," as the term implies, consists in limiting the patient to an extremely low diet, to confining him to

\* P. 349.



the house, and also to using some trifling local application to the primary ulcer. The rules of this treatment, however, appear to admit of some difference in degree. Thus the allowance of Dr. Fricke of Hambro' is four ounces of white bread, a bason of *soup maigre avec de la farine*, and six spoonfuls of *légumes* together with water gruel for drink in the twenty four hours. The treatment, by Professor Wilhem, is a slight variation, but hardly less severe; for he allows three light soups, three ounces of bread, and from four to six pints of warm water daily, while the patient is strictly confined to his bed during the whole time. In the hospitals of Stockholm, the treatment is something more liberal, and consists of four ounces of roast beef daily, five ounces of bread, while the patient is confined to the ward for six weeks, and treated with a decoction of *smilax aspera*. But this indulgence in animal diet is condemned by Desruelles, who affirms that indulging or abstaining from an animal diet, makes a considerable difference in the times of healing of the primary ulcer; for he found that the mean duration of a number of cases treated by the *cura famis*, and limited to a vegetable diet, was thirty days, while in a similar series of cases treated in the same plan, but allowed animal food was fifty days. He found also a similar difference in the times of healing the primary ulcer when mercury was used, according as the patient was limited, or otherwise to a vegetable diet. Thus the mean duration of a given number of cases treated by mercury, but limited to a vegetable diet, was forty-four days, while, when animal food was allowed, it was fifty-six days. Desruelles, therefore, concludes that, in all cases, animal food has retarded the cure, so that whatever medical treatment be adopted, the patient ought to be strictly limited to a vegetable diet while labouring under the primary form of syphilis. Ricord agrees with Desruelles, that animal food ought, as a general principle, to be avoided in the cure of primary syphilis; but adds that, in feeble constitutions, he has often seen the worst consequences from its adoption, and that it is often necessary to give the patient the support of a liberal and abundant diet.

In the cure of the secondary symptoms, the patients are generally impatient when limited to a milk or vegetable diet, and, perhaps, iritis is the only disease in which a forbearance from animal food, is essentially necessary. In rupia, in sloughing sore-throat, and when the patient is broken down by severe affections of the bones, a full diet of animal food, with a liberal allowance of wine or porter, appear greatly to facilitate the patient's recovery. In very severe cases, perhaps, it should be added, there is no greater restorative than change of air.

*Preventative treatment.*—When a party has been exposed to infection, there is no other preventative remedy than extreme cleanliness. The chlorides have been recommended, but they have probably no power to neutralize the poison. But supposing them to possess such a property, still the application of these, or of a solution of bi-chloride of mercury, or of any other substance, must, under any circumstances, be too late to prevent the absorption of the poison, and consequently to prevent the contamination of the system.





## G O N O R R H Œ A

is a contagious disease, the poison, producing a specific suppurative inflammation of the mucous membrane of the urethra and glans, in the male, and of the mucous membrane of the genital organs, in the female. It occasionally, also, affects the mucous membranes of the eye and of the rectum ; a direct application of the poison is necessary, in all these cases, to the parts affected. The duration of this disease varies from a few days to many months.





## OF THE POISON OF GONORRHŒA.

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THE origin, as well as the time of the first appearance of gonorrhœa, is extremely obscure, for, although the ancients, and among them Celsus and Galen, have treated at large of abscess, ulcer, cancer and mortification of the genital organs, of phymosis, of paraphymosis, and of caruncula of the urethra, still they make no mention of a contagious disease like gonorrhœa. In the absence, then, of all evidence connecting this disease with the remoter periods of medicine, two hypothesis have been entertained, first, that it prevailed prior to the introduction of syphilis, and, again, that it was first observed about half a century after the breaking out of that disease. The first hypothesis has been most ingeniously supported by Mr. W. Becket, who has attempted to show,\* that a venereal gonorrhœa was known some time before the year 1494, the period when syphilis first burst forth. The earliest authority he mentions is a manuscript treatise of John Arden, an eminent surgeon in England, about the close of the fourteenth century. In this book, mention is made of burning, which, according to Becket, is an inward heat, or excoriation of the urethra. The second authority rests upon certain physical pieces supposed to have been written about the years 1390 and 1440. These works are said to contain some receipts for the cure of this burning, both in men and women. The third are certain manuscripts, rules and ordinances of the stews which were allowed to be kept at London, in the Borough of Southwark, under the control of the Bishop of Winchester. These documents are supposed to have been drawn up about the

\* The 30 and 31st vols. of the Philosophical Transactions.



year 1430. One of them begins thus, "Of those who keep women having a wicked infirmity;" and further, it inflicts the penalty of a fine to the Lord, of one hundred shillings on any stew-holder that keepeth any woman "wythin his hous that hath any syckness or burning." Others, on the contrary, have contended that gonorrhœa was not described till fifty years after the introduction of syphilis, in proof of which, Anstruc quotes the following passage, "in the fourth period, "from 1540 to 1550, several of the symptoms (of syphilis) "which had shewn themselves from the first eruption of the "distemper, seemed daily to abate of their violence, such as "pustules, gummata, pains, erosions of the parts, &c.; but, on "the other hand, there appeared a new symptom to make up "for this abatement, never before observed, though from that "time the most common, if not perpetual symptom in the "beginning of the venereal disease. I mean a virulent gonorrhœa, of which we have mention, first made by Brassa-volus, in his *Treatise de Morbo Gallico*, which he wrote in "1551, and published in 1553." Such is our imperfect knowledge of the origin of this disease, but which ever hypothesis we adopt, it seems certain that gonorrhœa is of secondary formation. With respect to the habits of this poison, it seems peculiar to the human race, for Mr. Hunter says, "I have repeatedly soaked lint in matter of "gonorrhœa, chancre and bubo, and introduced it into "the vagina of bitches without producing any effect. I "have also introduced it into the vagina of asses, without "any effect. I have introduced it under the prepuce of dogs "without any effect. I have also made incisions under the "skin, and it has only produced a common sore. I have "made the same experiments upon asses with the same "results."\*

*Remote cause.*—The combination of causes which produced this poison are entirely unknown. Many physicians have thought with Ricord that this disease is caused by an acrid and irritating discharge, and, consequently, not by a specific

poison. “But how many men,” says Beaumès, “know their  
“wives or other women, when infected with leucorrhœa so  
“acid as to excoriate the thighs of the parties without ever  
“contracting gonorrhœa. Yet, if these same women are  
“faithless, their husbands are immediately infected. I have  
“known,” he adds, “many married persons have connection  
“with their wives when labouring under the irritating dis-  
“charge of an incipient cancer of the womb, without injury,  
“although extremely sensible to the action of the gonorrhœal  
“discharge.” Admitting, therefore, that the mucous mem-  
branes of the genital organs are liable to be inflamed from many  
causes, as disordered state of the digestive organs, exposure  
to cold, mechanical violence, or from connection with a  
woman at the period of menstruation, or while labouring  
under leucorrhœa, yet the discharge which follows is, in  
general, not contagious, for if so, gonorrhœa must have been  
as well known to Hippocrates, Celsus or Galen as in the  
present day. The gonorrhœal discharge, consequently, differs  
from all others, having, with few exceptions, infected all those  
exposed to its actions in an endless series, from the time of  
the first appearance of the disease, and it follows, that how-  
ever unable we may be to assign its cause or its origin, that  
this contagious property must depend on the agency of a  
specific poison.

*Predisposing causes.*—The predisposing causes may be  
either constitutional or local. In general, the more feeble  
the health of the party, the greater the susceptibility, and the  
longer the duration of the disease. Persons usually consi-  
dered of a scrofulous habit, or of a lax fibre, and females who  
suffer much from leucorrhœa are those who suffer most from  
this complaint. “The urethra of those who have had vene-  
“real complaints, is more apt,” says Mr. Hunter,\* “to ex-  
“hibit symptoms similar to gonorrhœa than the urethra of  
“those who have never had any such complaint, and it is in  
“general, in consequence of the parts having been hurt by  
“that disease, that the simple gonorrhœa comes on.”

\* P. 33.



Every *age* appears liable to gonorrhœa. The opinion which prevails among the lower classes, that connection with a young and healthy person will cure the disease, has often led to the detestable practice of inflicting this affection even on very young children. It is occasionally seen in advanced age, but, in general, from the modes of life and passions of mankind, it is most common between the ages of twenty and thirty-five.

Men are, of course, affected in larger numbers than women, but both *sexes* are, perhaps, equally liable to this disease.

It appears, *climate* has an influence in the occurrence of gonorrhœa for, by the returns of the British army, that disease is much more frequent among the troops stationed in this country than in the Mediterranean or in the West Indies. Out of an aggregate strength of 44,611 of the dragoon guards and dragoons, 2449 are returned as labouring under this disease in the course of seven years; while in Gibraltar, out of an aggregate strength of 60,269, only 831 cases are returned for the long period of nineteen years; while in the Windward and Leeward Command the disproportion is still greater, for out of an aggregate strength of 80,661, only 838 cases are returned for twenty years. The infrequency of gonorrhœa among the inhabitants of warmer climates, is owing, perhaps, to the practice of more frequent ablution, and, consequently, to greater cleanliness.

According to the records of the Hôpital des Vénériens, at Paris, this disorder is greatly more frequent in spring and autumn than at other seasons of the year, perhaps owing to the holding of a greater number of fairs and festivals at those periods.

*Contagious.*—The evidence of the contagious nature of gonorrhœa is of the strongest description, namely, that a healthy person, having a given intercourse with a diseased one, is, with very few exceptions, certain of being attacked with the disease; gonorrhœa, likewise, is, for the

most part limited to a given class of persons. In a very few instances, the contagious nature of this disease has been proved by a voluntary inoculation, as in the celebrated cases related by Mr. Benjamin Bell;\* they are as follows, two medical students who, wishing to determine the questions of the identity of the gonorrhœal and syphilitic poisons, each interposed between the glans and the prepuce a dossil of lint, dipped in gonorrhœal matter, and allowed it to remain for twenty-four hours, expecting to see it produce chancres. In the one, however, there followed over all the glans and prepuce a violent degree of inflammation or gonorrhœa spuria. While in the other, the exterior inflammation was not great, but the matter finding its way into the urethra produced a gonorrhœa so severe that he was not cured for a twelve month.

It is impossible to expect many voluntary experiments to determine this question, for, although the progress of a chancre can generally be stopped, yet a purulent secretion from a mucous membrane, when once contracted, is often perfectly intractable, and may last for many months. But in the absence of direct experiments, inadvertence has often shown the reality of this property of contagion. Thus, the finger accidentally soiled with gonorrhœal matter has often produced a purulent discharge from the eye-lids, nose or lips, Beaumès gives the case of an ecstatic lover, who contracted the disease by a kiss; gonorrhœal matter has also been known to find its way into the rectum, and a discharge has taken place of a contagious character from that part. It should also be added to the direct proofs, that when swelling of the testicle has resulted from the sudden cessation of the gonorrhœal flux, this discharge has often been reproduced by the introduction of a fresh portion of gonorrhœal matter into the urethra. Beaumès gives two cases of this description.

Among the peculiarities of this poison, Mr. Hunter, has determined that the application of matter from a gonorrhœa

\* Vol. i. p. 492.



to a bubo, does not, in the least, retard the cure of that bubo, nor does the matter of a chancre applied to a bubo, nor the matter of a bubo applied to a chancre produce any bad effect, though if venereal matter is applied to a common sore, it will often produce venereal irritation.\*

*Fomites.*—The possibility of this disease being communicated by fomites has been abundantly proved by the experiments which have been related of successful inoculation by this virus. Mr. Hunter mentions an instance, also, in which a gentleman who had not cohabited with any woman for many weeks, to all appearance caught a gonorrhœa from a piece of plaster which had adhered to his glans penis in a necessary abroad. This, he supposes, must have been contaminated with gonorrhœal matter, and communicated the infection.

*Susceptibility exhausted.*—It is probable that the susceptibility to the poison of gonorrhœa is never entirely exhausted, although it has many degrees. The most general maxim in this disease is, that the first gonorrhœa is the most severe, and the succeeding ones become milder and milder, till, in some cases, the danger of infection almost vanishes. Mr. Hunter is so entirely of this opinion, that he conceives a man after having suffered a gonorrhœa may frequent women of the town, and that for years successively, without being again infected. He gives more than one case, also, of a person cohabiting with a diseased woman, and having been in the first instance infected, yet, by continuing the connection, has, by *habit* become so insensible to the action of the poison secreted by this particular individual as to have recovered his health. It has been proved that the woman has continued to be diseased, by her infecting some new but healthy paramour, and, also, supposing the first mentioned party to be out of the *habit* of seeing this woman, by the fact, that should he now receive her embraces, he would be as easily infected as the other. There are, however, instances in which no *habit* diminishes the susceptibility to the disease, but, on the con-

trary, the more insures the infection, and aggravates the symptoms.

*Co-exists.*—The poison of gonorrhœa is capable of co-existing with many other poisons. It occasionally happens during typhus fever, that the discharge becomes most profuse and debilitating in the latter stages, while in the earlier ones it may stop altogether. It frequently also, co-exists with erysipelas, and, probably, with every other disease known to depend on a morbid poison.

The frequent co-existence of gonorrhœa with syphilis has led to the hypothesis that these two poisons are identical. The outline of this argument has already been given. Mr. Hunter, it is well known produced a sore by inoculating with gonorrhœal virus. Ricord, also, in a few instances,\* produced sores in forçats. These results give some countenance to this hypothesis, but Ricord concludes that his experiments prove that ulcers† which are produced by inoculation with gonorrhœal virus are not syphilitic, for they all yielded to treatment which would have been inefficacious against syphilitic sores. He gives as the result of his experiments with gonorrhœal matter in its different stages on 667 patients.

1st.—That the matter of gonorrhœa applied to a healthy mucous surface produces gonorrhœal inflammation by so much the more readily, as the matter is more purulent.

2nd.—Under no circumstances does it produce a specific ulcer, but as an irritating matter, like that of coryza, it may excoriate the skin, with which it may be brought in contact. These results have been so often verified, that M. Leon Ratier, his pupil has inoculated himself before the class with gonorrhœal matter on the skin of the forearm without any unpleasant result.

3rd.—Matter taken from a gonorrhœal bubo never produces any result by inoculation.

4th.—That as the secondary symptoms follow gonorrhœa in about the same proportion of cases, as ulcers are found in the urethra, they probably in all cases proceed from that cause.

\* P. 110.

† P. 112



The conclusion, therefore, which Ricord draws from his endless experiments, are in accordance with those of the profession generally, or that gonorrhœa and syphilis constitute two diseases, distinct in their form, causes and consequences. He also quotes eighty-five similar experiments made by Dr. Marion of the Hôpital de Louvain\* of which, five produced chancres, and which were determined to have been caused by ulcers of the urethra; while, of eighty other cases submitted to inoculation, no result was produced, however numerous the punctures, and whatever the stage of the gonorrhœal matter. From all these data, then it must be considered as determined, that there is no identity between the two poisons of gonorrhœa and syphilis.

*Modes of absorption.*—Immediate contact of this poison with the part subsequently affected is necessary to the production of this disease; and the question is often asked, Why does the poison of gonorrhœa affect the urethra so much more frequently than that of syphilis? The answer is, perhaps, from its greater quantity. But the greater difficulty which presents itself is, whether the poison after having found its way into the urethra is absorbed, or whether simple contact alone is sufficient to produce the disease, without a general contamination of the system. Reasoning from all analogy, the poison must be absorbed, and must infect the blood before it produces its specific affection of the mucous membranes of the urethra, in the male, and of the genital organs of the female; and, if we admit that orchitis, or cutaneous eruptions are secondary actions of the poison, and not the result of sympathy, this law may be considered as satisfactorily proved. It would appear, from one fact related by Mr. Hunter, of a young woman who drank by mistake, a basin of water which had been used for ablution in gonorrhœa, and which, consequently, contained some portion of the virus, that all mucous membranes are not equally liable to the action of this poison, for this person escaped without any particular accident. It is certain, however, that

\* P. 553.

disease results from its contact with the mucous membranes of the eye, the nose, the lip and the rectum.

*Period of latency.*—The time which elapses after contamination before a gonorrhœal discharge is established, varies considerably in different persons. In some cases it has occurred as early as six hours after connection, while Mr. Hunter mentions cases in which it did not show itself till the end of five or six weeks. Cullerier and Ratier have mentioned a case in which five months were said to have elapsed from the time of infection till the appearance of the disease, but it is probable much misrepresentation must have prevailed. Mr. Hunter thinks when the extreme periods he mentions have intervened, that the poison has not altogether remained inactive, and he gives a case in which pain and uneasiness were felt in the urethra for some time before the appearance of the specific discharge. He concludes, therefore, that inflammation may precede the discharge by some considerable length of time. Cases of this kind, however, must be extremely rare, and more commonly, this previous stage is short, and in many, perhaps, does not exist at all. Every other period between six hours and six weeks has been mentioned by different writers, but, in general, it is from three to twelve days.

*Pathology.*—The theory of this disease, as reduced from analogy, is, that the poison of gonorrhœa is absorbed and mingles with the blood, and after a given period of latency, produces a suppurative inflammation of the genital mucous membrane, to which it has been directly applied. It is probable this poison has only one secondary action, or on the testicle, when it produces orchitis in a given number of cases. Many authors, however, have attributed a slight inflammation of the fauces, and also certain slight cutaneous eruptions to the same cause, but the proofs are at present insufficient to establish this doctrine. Bubo is, probably, the result of sympathy, and stricture the effect of local inflammation.

The period of latency passed, the gonorrhœal poison produces a suppurative inflammation of the genital mucous membrane, to which it has been directly applied. The pus discharged, is white, yellow, greenish, or mixed with



blood, according to the state of health of the patient, or of the violence of the disease. It is, likewise, alkaline, and possesses the other usual chemical properties of ordinary pus, from which it cannot be distinguished by any test which does not bring into action its specific nature. The following are the parts it affects in the male, and also in the female.

PARTS PRIMARILY AFFECTED IN THE MALE.		PARTS SECONDARILY OR OCCASIONALLY AFFECTED IN THE MALE.	
Urethra, producing Gonorrhœa	} „ Gonorrhœa Spuria	Testes producing Orchitis	} Inguinal glands producing Bubo
Glans			
Prepuce			

The proportionate frequency of orchitis to gonorrhœa, and of stricture to gonorrhœa may be estimated from the following data :

Diseases.	Dragon Guards and Dragons, 1st January, 1830, to March 31, 1836, aggregate strength 44,611	Gibraltar. 1818 to 1836, 60,269	Malta. 1817 to 1836, 40,826	Ionian Islands. 1817 to 1836, 70,293	Bermudas. 1817 to 1836, 11,721	Nova Scotia, New Brunswick 1817 to 1836, 46,442	Canadas. 1817 to 1836 64,280	Windward and Leeward com-mand. 86,661	Jamaica. 1817 to 1836, 51,567
Gonorrhœa	5449	831	2516	1538	147	1188	1349	838	236
Hernia humeralis	714	864	675	533	127	467	545	906	227
Strictum Urethræ	100	91	55	58	12	46	37	90	49

PARTS PRIMARILY AFFECTED IN THE FEMALE.			PARTS SECONDARILY OR OCCASIONALLY AFFECTED IN THE FEMALE.		
Vulva	}	Gonorrhœa	}	Separate or Combined	Inguinal glands producing Bubo
Vagina					
Urethra					
Uterus					
Uteritis					

It was formerly supposed that the matter of gonorrhœa proceeded in the male from ulceration of the urethral membrane. Dr. William Hunter, however, having observed other mucous membranes covered with pus, and yet not ulcerated, ventured to question this doctrine as early as 1750, and a short time after, or in 1753, his brother, Mr. John Hunter, had an opportunity of examining the bodies of two criminals, who were executed while labouring under a severe form of gonorrhœa, but, although he found some redness of the mucous membrane of the urethra, there was no ulceration. He afterwards examined the urethræ of many other persons who died labouring under this affection, and in all he found redness, but without ulceration. These researches, confirmed

by those of Morgani, and much subsequent observation, have determined, as a general law, that gonorrhœa arises from a suppurative inflammation of the mucous membrane of the urethra, without breach of surface, and that ulceration occurs only in a few rare cases, which are exceptions to the rule.

It is generally supposed that the gonorrhœal inflammation does not affect the whole surface of the urethral membrane, but is commonly limited to a given portion of it. This opinion is said, first to have originated with Terraneus, an Italian physician, in 1709, and was subsequently adopted by Boerhave, Haller and Mr. Hunter. The points on which these eminent pathologists conceive the inflammation most commonly fixes, or in which it is manifested with the greatest intensity is the fossa navicularis, or the portion immediately under the glans, and termed by Mr. Hunter "the specific distance." This opinion has been generally received by the profession, but of late has been questioned. Boyer, for example, thinks\* that the inflammation extends throughout the whole length of the canal, and that the fact of the redness being found only in the anterior portion, is caused solely from the part being pendant after death. M. Cullerier, also, had an opportunity of examining a newly inflamed urethra, and he found a bright redness, not only in the fossa navicularis but also traces of red lines as far as the membranous portion. These facts, and the known circumstance, that extensive suppurative inflammation of mucous membranes may exist, and the redness disappear after death, render some further investigation of this subject desirable. The symptoms also, evidently point to a greater extent of inflammation, for the soreness along the course of the urethra, and especially in the perineum, show that the remoter parts are often inflamed. The formation of stricture, commonly in the bulbous parts, or more than five inches from the supposed specific "distance," and the frequent affections of the prostrate portion, almost demonstrate the opinion of Mr. Benjamin Bell, who conceives that, although, in nine

\* P. 56.



cases out of ten, the disease may be limited to the anterior portion of the urethral membrane, or to the fossa navicularis, still that it may extend to the bulb, to the prostrate, and even to the mucous membrane of the bladder.

The inflammation, however, is not always confined to the membrane of the urethra, but frequently spreads to the surrounding tissues; under these circumstances, the cells of the corpus spongiosum become bound down by adhesive inflammation, and the phenomena of chordee are the consequence; small tumours, also, may frequently be noticed along the inferior surface of the penis, in the course of the urethra, and, almost always, behind the pubis; these are supposed to be inflamed glands which often acquire a large size, and, sometimes suppurate, forming phlegmonous abscesses. These, in some instances, burst internally, and in others, externally, occasionally, both externally and internally, when a false passage is made for the urine. Abscesses of this kind are often met with in the situation of Cowpers's glands, and are termed fistula in perineo.

When gonorrhœa is chronic, or has been often contracted, the most usual disease of the urethra, is *stricture*. The formation of a stricture is as follows, when the canals of the body are inflamed, as the intestines or œsophagus, they have a strong tendency to contract, and while thus contracted, the affected part is often bound down by adhesive inflammation, so that its diameter is greatly diminished. A stricture of the urethra, therefore, consists of a contraction of a greater or less portion of this canal, by which its opposite sides are approximated, its passage narrowed, and, in some instances, obliterated. According to Mr. Hunter, this disease seldom occupies any great length of the urethra, and, in most instances, he had seen is of no greater breadth than if the part had been surrounded by a piece of packthread. Mr. Hunter, however, adds,\* that he had seen the urethra contracted for more than an inch in length, owing to its coats or internal membrane being irregularly thickened, and forming a winding canal.

\* P. 113.

Sir Everard Home, also, has seen two strictures within an inch of each other, and the space between them thickened.

“A stricture,” says Mr. Hunter, “does not arise, in all cases, from an equal contraction of the entire circumference of the urethra, but, in some instances, from a contraction of one side only.” Sir Everard Home has met with cases, in which three strictures existed on the same side of the urethra, the other being perfectly healthy. This form of the disease throws the passage to the opposite side, and causes considerable difficulty in passing a bougie. Mr. Hunter describes the strictured part as harder and whiter than the rest of the urethra.

A stricture may form in any part of the urethra, but it is seldom found within the “specific distance.” Mr. Hunter, also, adds that he had never seen a stricture of that part of the canal which passes through the prostate gland. The two parts of the urethra which are naturally the most narrow, are found to be the most liable to stricture, or just behind the bulb, a distance of six and a half or seven inches, and again at about four inches and a half from the orifice of the glans. They are usually slow in forming, and sometimes thirty, or even forty years have elapsed from the cure of a gonorrhœa to the formation of a stricture. They are as common, he adds, to those who have had gonorrhœa slightly as to those who have had it severely, and seldom form during the violence of the inflammation, nor for some time after the infection is gone. In most instances, there is only one, but sometimes there are more than one, and Mr. Hunter has seen half a dozen in one urethra.

The mucous membrane covering the stricture, sometimes exhibits a natural appearance, at others it is a little thickened, and occasionally its surface is abraded and ulcerated. These two last effects are generally produced by attempts to pass a bougie, and sometimes false passages have been made in consequence of employing too much violence in the use of this instrument.

The consequences of stricture, besides the inconvenience in passing water, are that the urine being forcibly driven by the



efforts of the bladder, irritates the parts immediately behind the stricture and produces inflammation and abscess. The abscess usually breaks externally and internally, and a fistulous opening is formed with hard edges and which is difficult to heal. The most usual seat of these abscesses is behind the scrotum, because the most common seat of the stricture is at or near the bulb of the urethra. Sometimes there are more than one of these openings leading to short canals, which run in different directions.

When the gonorrheal inflammation is violent or long continued, the prostate has occasionally been acutely inflamed, and has even suppurated. This latter termination is infrequent, but when it does happen, it is exceedingly disastrous on account of the contraction of the prostatic portion of the canal, and also because it is impossible for art or nature to effect the evacuations of the pus, which is commonly found in small foyers surrounding the swollen gland. The enlargement of the prostate, however, like the formation of stricture is not always an accident resulting from acute inflammation of the urethra, more frequently it comes on five or ten, or even more years after the attack. In these cases the gland is enlarged, so that the diameter of the canal is contracted at that part, rendering the passage of the urine at all times difficult, and sometimes suppressing it altogether, or allowing it to pass only drop by drop.

Caruncles are seldom the causes of obstruction of the urethra, compared with stricture, but they sometimes are found, though rarely. "I have," says Mr. Hunter,\* "in all my examinations of dead bodies, seen only two, and these were in very old strictures, where the urethra had suffered considerably, they were bodies rising from the surface of the urethra, like granulations, or what would be called polypi in other parts of the body."

The disease termed *gonorrhœa superficialis vel spuria*, consists of an inflammation of the membrane covering the glans penis, and inner surface of the preputium, followed by a discharge similar to that from the urethra. The glans and prepuce are

\* P. 167.

commonly greatly swollen, red and painful. Their surfaces also may be superficially ulcerated. In this case the extensibility of the glans penis being greater than that of the preputium, phymosis, or paraphymosis may take place. In some instances, the constriction has been so considerable, as to produce gangrene and sloughing of the entire penis. When the disease attacks the glans, it usually begins in the fossa or root of that part and at the insertion of the prepuce.

A swelling of the testicle, or *orchitis* is a frequent occurrence in gonorrhœa, and it has been seen that it is met with in the ratio of one in every three cases. This affection may take place at any stage of the disease, but is most common towards its decline, and it usually coincides with a diminution or entire suppression of the discharge in urethral gonorrhœa. It is not known as an accompaniment of gonorrhœa superficialis.

There are few persons that fall under orchitis, and we are consequently not well acquainted with the pathology of this affection. The external symptoms are a dull pain and slight tumefaction of the epididymis, especially at its union with the testicle, which very soon participates in the inflammation, and speedily acquires a magnitude of three or four times its ordinary volume. The body of the testicle is at first soft and pulpy, but as the swelling increases, it becomes a large hard tumour. The spermatic cord, as well as the vas deferens, are often thickened and painful, and the veins of the testicle varicose. It is generally thought that the cord and the vas deferens may be separately affected; but Ricord states that the epididymis is always the part first attacked, then the cord, and lastly the vas deferens.\*

\* “It has been asserted,” says Mr. Hunter, (p. 54) “but without proof, that in cases of swelled testicle, it is not the testicle that swells, but the epididymis. The truth (p. 55) is, it is both the one and the other. Any man that is accustomed to distinguish between a swelling of the whole testicle and that of the epididymis, will be immediately sensible, that in the hernia humoralis, the whole testicle is swelled. The testicle assumes the same shape that it does from other causes, where we know from being obliged to remove it, that the whole has



If the disease continues to make progress, the tunica vaginalis inflames, and serum or lymph is thrown out. Mr. Hunter has seen from this latter cause, several instances in which adhesions had taken place between the tunica albuginea and tunica vaginalis; more commonly hydrocele occurs, either from irritation or from pressure on the veins. Inflammation of the testicle seldom terminates in suppuration, and Ricord even affirms that the body of the testicle, though suffering from pressure of the parts inflamed around it, most commonly remains free from disease. When the scrotum, however, is inflamed, which is infrequent, suppuration of that part is more common. The acute stage of this disease, generally terminates within the first or second week; but the epididymis often remains for a long time hard and painful, and years are often required for its entire resolution. The body of the testicle also occasionally, though more rarely, remains hard and enlarged for a considerable length of time. The inflammation of the affected parts subsides in the inverse order of attack, or the parts last diseased are first cured. The inflammation also yields rapidly when acute, and slowly when chronic.

The left testicle is more frequently affected than the right, and it is most unusual for both testicles to be affected at the same time, although the inflammation often subsides in the one, and attacks the other. Mr. Hunter first remarked that orchitis seldom occurs when the gonorrhœal inflammation is at its height, but most commonly towards its close and when the patient imagines he is recovering. According to Ricord, it does not occur in one case in 300 in the first week; is not unfrequent in the second, but is most common in the third or some subsequent week, when the greatest severity of the

“swelled. The pain is in every part of the testicle. I have seen such  
“swellings suppurate at the fore part, and have known several instances  
“of adhesions between the tunica albuginea and vaginalis from such  
“causes. Such changes would not have taken place if the body of the  
“testicle had not been in a state of inflammation.”

attack has passed away. Ricord also affirms,\* contrary to the general opinion, that the purulent discharge from the urethra, which always greatly diminishes as the testicle swells, never completely ceases, or in not more than in one case in 200. It returns, in general, with some abundance on the subsidence of the affection of the testicle, but seldom lasts long. Three opinions are entertained of the cause of this disease; first, that it results from sympathy with the inflamed urethra, again, that it is caused by absorption of the gonorrhœal matter, and lastly, that it is a secondary action of the poison.

Another occasional effect of gonorrhœa is *Bubo* or inflammation of the inguinal glands, which may terminate in all the ways described in syphilis. According to Ricord, however, the pus obtained from them, does not produce any syphilitic affection on inoculation. Beaumès, says,† that bubo is much less frequent in gonorrhœa than in syphilis, and also that the inguinal glands, are more slightly affected, more easily resolved, and less frequently suppurate. It is doubtful whether this affection is caused by sympathetic irritation, by absorption of pus, or by a secondary action of the poison; but probably by the two former.

In some instances, inflammation of the absorbent vessels occurs. This affection may exist alone, or may accompany the affection of the glands. This affection is denoted by a hard and painful cord, which proceeding from the prepuce along the dorsum of the penis, reaches sometimes as far as the groin.

In the *female*, the vagina is usually the principal seat of gonorrhœal inflammation, and some authors contend that it is confined to the vagina; but there are cases in which pressure on the meatus urinarius, produces a flow of pus, the vagina being in no degree affected. These parts may, therefore, be either separately or conjointly affected. When the vagina and urethra are alone diseased, nothing is to be seen externally; but on separating the labia, we observe some

\* P. 754.

† P. 262.



inflamed points, which are the orifices of the mucous glands. In severe cases, the parts both external and internal are more or less swollen and red, the meatus urinarius inflamed, and also the membrane enveloping the clitoris, and this inflammation sometimes extends to the neck of the uterus, causing exquisite pain. When the irritation is great, one or more small abscesses, occasionally form in the cellular tissue of the labia.

In chronic gonorrhœa, the appearance of the parts is often natural. Mr. Hunter states that he had frequently examined patients, who complained of all the usual symptoms, such as increased discharge, pain in making water, and soreness, and yet could perceive no difference between these parts, and such as were quite healthy.

In the female, stricture of the urethra, is extremely rare ; but it is not uncommon to find caruncula or polypus in the interior, or at the orifice of the urethra, causing great pain, and often keeping up a discharge, which does not cease till their removal either by excision or cauterization.

According to Ricord, *gonorrhœal ophthalmia* always proceeds from a direct application of the matter of gonorrhœa, and does not arise from sympathy, metastasis, or any secondary action of the poison. This disease is, consequently, more common to men than to women, on account of their greater neglect of cleanliness. The symptoms of this disease are those of acute ophthalmia in its highest degree. As early as the first or second day, the conjunctiva as well as the internal surface of the eye-lids, as also the globe of the eye is gorged and swollen, so as to form a considerable prominence and give an appearance of the cornea being depressed ; and this salient state of the conjunctiva, is considered by Lagneau, as almost peculiar to this form of ophthalmia, and its diagnostic symptom. From the first moment of attack, light is painful, and the secretions of the eye viscid and purulent, and resemble in every respect, the yellow, greenish discharge of urethral gonorrhœa, and so acrid, that it inflames those parts of the cheeks and nose over which it flows. The eye lids now become

swollen, and the tumefaction of the conjunctiva excessive. The cornea also becomes nebulous, or ulcerates, and pro-cident staphyloma follows. Sometimes the humours of the eye escape and blindness is the inevitable consequence—a result which may take place in four or five days, and has been known to occur in twenty-four hours. In the majority of cases, however, the ophthalmia is chronic, the symptoms less severe, and the patient recovers without any disorganization of the globe of the eye. In other cases, the graver accidents subside, and the patient in an almost unhopèd for manner, preserves his sight; but, nevertheless, ulcers often form on the eye-lids, or opacity of the cornea takes place, which is difficult to remove.

Those authors who contend, that secondary affections follow gonorrhœa, admit that the skin and the throat, are the parts almost exclusively affected, and that the cutaneous eruptions are for the most part papular or erythematous, and that the affections of the throat are uniformly slight.

*Symptoms.*—Gonorrhœa may be acute or chronic, and in the male, there are two varieties of this disease, gonorrhœa and gonorrhœa spuria.

Acute gonorrhœa in the male is a discharge of purulent matter from the urethra, having for its ordinary concomitant, pain during the expulsion of the urine (ardor urinæ) frequent desire of micturation, together with frequent erections during sleep, and in some cases chordee.

The first symptom of gonorrhœa in the male, is generally an itching about the orifice of the urethra, which some authors have described as not disagreeable, and this usually comes on, about forty-eight hours after contamination. At the end of three or four days, this becomes distressing, when the urethra inflaming, its lips become red and swollen, so that the diameter of the canal is diminished, and pain is now felt on passing the urine, which increases till it becomes so intense, as to be termed scalding. The inflammation extends also to the glans, which is swollen, tense, and according to Mr. Hunter, resembles “a ripe cherry.” The erections are now



frequent and painful, and at night often intolerable, and sometimes of that nature, termed chordee. Occasionally, the inflammation extends to the prepuce, and causes phimosis or paraphimosis, and the patient finds walking or riding both difficult and painful.

The discharge which usually begins a few hours after the titillation, or itching is first a semi-transparent fluid, which glues up the orifice of the urethra, and then about the sixth or eighth day, though often sooner, a puriform matter follows in considerable abundance from the urethra, and may be white, yellow, green, pink, or any of the usual variations of colour, as well as of consistency of pus.

The inflammatory symptoms, are usually at their height about the fourteenth day, and continue so till the twenty-fifth or thirtieth; when the pain diminishes, the erections become less frequent, and the discharge commonly changing its colour, gradually becomes less abundant, and at length disappears. In general, gonorrhœa does not cease before the thirtieth or fortieth day, and is often prolonged for many months.

Such is the usual course of this disease, but there are cases in which the symptoms are much less severe, and the gonorrhœa so indolent, that the patient suffers no pain, and is only conscious of being diseased by the presence of the discharge on his linen. On the contrary, there are many others, in which the symptoms are much more severe than those just described; the inflammation extending along the urethra, till it reaches as far as the perineum, the prostatic portion, and even the bladder. The discharge is now often mixed with streaks of blood, and sometimes a few drops of blood follow or precede the flow of urine; the urethra also becoming more and more swollen, and its diameter more and more contracted, the difficulty of passing the urine proportionably increases, while the irritation of the bladder causes a more than usually frequent desire to micturate, and even spasms occur at its neck or at the orifice of the anus. If under these circumstances, the patient is so imprudent or so depraved as to indulge in sexual intercourse, the act is always accom-

panied by great pain, and during the emission is so severe, that it has been compared to the introduction of a red hot iron into the urethra, and the seminal fluid is commonly mixed with blood.

The course of gonorrhœa is often much more chronic than has been mentioned, and it often lasts many months or even years. The circumstances attending the subsidence of gonorrhœa are very various. The pain in passing water ceases, and the sense of weariness in the loins and hips, and the soreness of the urethra, testicles and scrotum, is no longer felt. Sometimes the discharge becomes thicker and sometimes thinner, and it often changes from a yellow to a green or white colour. Sometimes, instead of subsiding gradually, it is suddenly suppressed by the coming on of inflammation of the testicle, and then perhaps returns for a few days, when it subsides altogether. At other times, it diminishes to a few drops, attended with so little inconvenience, that the patient is hardly sensible of being diseased; but these drops are infectious, and generally attended with some disease of the prostatic portion of the urethra. Beaumès gives several cases of this “suintement,” or “blenorragies sèches,” which lasted many months, and infected the wives of several of the parties immediately after marriage. In other cases, the discharge of a thin watery green, or yellow pus is established, and lasts for many months, and is now termed a “gleet.” The matter of gleet is supposed to be non-contagious, but this doctrine is dangerous, and has led to most mischievous consequences. It has happened, also, that after the apparent cure, the patient without any fresh infection, has relapsed, and Mr. Hunter mentions a case, in which the interval was a month after every appearance of disease had been removed.

When the disease is complicated with *bubo*, the inguinal glands are swollen, sore to the touch and sometimes acutely painful. Although they do not usually suppurate. Yet Mr. Hunter has seen cases, when the pain extended down the thighs, to the abdominal members and buttocks, “so that



“ the patient has been obliged to lie quiet in a horizontal posture.”\*

When the *testicle* inflames, the patient suffers from excessive pain in the part extending to the back, loins and pelvis. The stomach and bowels also generally sympathise, and nausea, and even vomiting, are common symptoms. “ Here,” says Mr. Hunter, “ we have from the testicles a chain of sympathies such as we had in consequence of the irritation, running along the whole of the urinary passages ; first, the testicle is affected from the urethra, then the spermatic cord, the loins, intestines, stomach, and from these in some measure, the whole body. After being inflamed, it is generally a long time before the swelling of the testicle, entirely subsides ; but by degrees it becomes even softer perhaps than natural, and then it gradually diminishes. But many years may elapse before the epididymis is reduced to its natural texture.” It has been a question, whether a hard and enlarged testicle, does, or does not secrete. Lagneau, however, gives a case, in which during an erotic dream, an emission took place, mixed with blood, and which was soon followed by the recovery of the patient.

When the *female* is affected with gonorrhœa, the vagina is often alone attacked, and this part not being endowed with much sensibility, the pain is trifling. When, however, the disease extends to parts more sensible than the vagina, as the inner surface of the labia, the nymphæ, clitoris, carunculæ myrtiformis, and meatus urinarius, the parts are so sore and painful, as not to bear to be touched—the patient can hardly walk, and great pain is experienced when the urine comes in contact with the inflamed surfaces, as it must unavoidably do, when the bladder is emptied. The parts affected are likewise often greatly swollen, so that we can scarcely introduce the finger into the vagina, while the discharge is acrid and excoriates the parts over which it flows. In some cases, the

bladder sympathises, and produces, as in men, the same irresistible desire to void urine, the same micturation and sometimes the same retention. The inflammation also sometimes affects the mucous glands, producing hard swellings of the inner surface of the labia, which sometimes suppurate, producing small abscesses of the vagina.

Women also very often labour under chronic gonorrhœa, without suffering any acute symptoms, and consequently often communicate this affection, without knowing that they themselves are diseased. No more difficult question exists in medicine, than to determine whether they are or are not affected. "The kind of matter," says Mr. Hunter, "gives us no assistance in distinguishing gonorrhœa, for it often happens that the discharge in fluor albus, puts on all the appearances of the venereal matter, and an increase in the discharge, is no better mark, by which we can distinguish the one from the other. The appearance of the parts also gives us but little information, for I have frequently examined those, who confessed all the symptoms, such as an increase of discharge, pain in making water, soreness in walking or when they were touched, yet I could see no difference between them and sound parts. I know, he adds, of no other way of judging in these cases, when there are no symptoms sensible to the person herself, but from the circumstances preceding the discharge, or the previous history, and the connections she may be supposed to have had with other diseased persons."

Mr. Hunter also gives the following remarkable instance of the almost indefinite duration of this disease in the female. A young woman was received into the Magdalen Hospital, and remained the usual time, which is two years. The moment she came out, she was picked up by one who was waiting with a post chaise, to carry her off, and she gave him a gonorrhœa.

In women a relapse is more frequent than in men, the discharge, although constantly mistaken for fluor albus, is nevertheless often in a high degree infectious; so that in women of the town, it frequently becomes an inexhaustible



source of contagion. In other cases there is something capricious in the contagious nature of the discharge, which requires a certain predisposition to give it effect; a given party will often be infected, while another who has equally deserved it, escapes with impunity.

The symptoms of *Gonorrhœal opthalmia* have been described, when treating of the pathology of the eye.

*Treatment.*—The treatment of gonorrhœa in the male is either abortive or general. In the former, the object is to cure the discharge in a few hours; in the latter, the disease is allowed to run its course, which is commonly from five to six weeks, the practitioner only interfering to obviate symptoms, and to abridge its duration, when of unusual length.

The simplest abortive treatment is as soon as the discharge appears, to direct the patient to steep the penis in moderately hot water for a few minutes, till a degree of faintness is produced, and to repeat this fomentation two or three times in the twenty-four hours. This mode of applying heat is exceedingly exhausting, and if the disease be indolent, often removes it in a few hours. Another mode of abortive treatment, is to throw a powerful injection up the urethra, as ten grains of nitrate of silver, to an ounce of distilled water, and when the disease is of an indolent character, and without pain, this often succeeds.

In other cases, it is a common practice, whatever the symptoms and the stage of the disease, to exhibit large doses of copaiba, and this method occasionally effects a cure, or should it fail except having been made most excessively sick, and having something aggravated the symptoms, the patient is seldom in a worse state than before making the experiment. Ricord has attempted to determine the periods, at which copaiba may be had recourse to, with the best chances of success; and he conceives them to be the four first days, after the appearance of the discharge, and also after the acute stage has passed. The practice of this eminent surgeon, is, when the patient is seen as early as the first or not later than the fourth day, to apply twenty, thirty, or forty leeches to the perineum, in every case, where pain accompanies the

discharge, and then to exhibit the copaiba. In cases, however, where pain exists, the local bleeding may be omitted. In addition to these means, he often employs a local treatment, as a superficial cauterization of the urethra, or else a mild graduated injection. In the former case, he introduces an armed bougie, and, having unmasked the nitrate of silver, withdraws the instrument gently, rotating it, so as to produce a superficial cauterization of the whole canal. If this operation is followed by an excess of inflammation, it must be reduced by leeches and fomentations. On the contrary, if no such effect results, the cauterization should be repeated at the interval of three or four days. In some cases, he introduces a pledget of lint to keep the lips of the urethra asunder. Another method of local treatment, which he recommends as preferable to the former, is to inject a weak solution of nitrate of silver, beginning with a quarter of a grain, to an ounce of distilled water, and to increase its strength by the addition of a quarter of a grain every twenty-four or forty-eight hours, till there is such a diminution of the discharge as to limit the dose, or else such an increase of pain as to forbid its further use. By these means, he says, it is not rare to see the discharge cease in three or four days; or, should it continue, the symptoms are generally mild, and the disease commonly terminates in fifteen or twenty days.

The patient may neglect to apply for advice till some days after the disease is established, and in this advanced, but still acute stage, copaiba occasionally succeeds, but, in general, this remedy is now entirely inefficient—revolts the stomach, and even aggravates the symptoms. “When, however,” says this author, “the acute stage has ceased, although the glans “and lips of the meatus be still red and slightly swollen, I “have recourse to those remedies which are termed ‘par “excellence’ anti-gonorrhœal, but should they occasion the “least increase of inflammation, I abandon them, and again “have recourse to antiphlogistics.”

Copaiba is considered to be a species of turpentine; or balsam, as it has been termed, and from which may be distilled a volatile oil, leaving a pure resin as a residue. The balsam



is generally considered as the most efficacious, and as sitting the most easily on the stomach. The dose in the last pharmacopeia is described as being from a scruple to a drachm, but the medicine has been employed in much larger doses, both in this country and on the continent. Monteggia and Fuller have given two to three drachms for a dose. Ribes found, in consequence of a mistake made by a patient, that it might be given to the amount of one to two ounces in the twenty-four hours, and he has prescribed it to this amount in every stage of gonorrhœa, and even when accompanied with swelled testicles, bubo, or gonorrhœal ophthalmia ; and he gives many cases of swelled testicle cured in a few days by these large doses.\* Rossignol, also, says he has cured upwards of three hundred patients in less than a week, by one to two drachms a day. These practitioners have given the balsam pure, or mixed with syrup or mucilage, or yolk of eggs, or with powdered sugar.

This medicine, however, often makes a most disagreeable impression on the stomach, so that, by many patients, it is constantly rejected. MM. Velpeau, Brettoneau and Labat have, consequently, given it in an enema, dissolved, either in mucilage, or yolk of egg, in doses varying from 3j to an ʒj a day, adding to it laudanum to cause it to be retained. Velpeau found it produced the best effects between the fourth and seventh day, and that after the eighth or tenth day, it either entirely succeeded or entirely failed.†

As copaiba yields, on distillation, nearly half its weight of a volatile oil, this has been tried, but is found to be less active than the balsam. The properties of the resin which is left as a residue are not perhaps determined, but they are generally supposed less efficacious than the volatile oil.

It has been proposed to solidify copaiba by gradually mixing it with one sixteenth of its weight of calcined magnesia. At the end of a fortnight, it acquires the consistency and transparency of gum, so that it can

\* Bull. de la Société d'Emulation, Sept. 1822.

† The roseola that copaiba sometimes produces does not, in all cases, prevent it producing its specific effects on the urethra.

be made into pills, thus avoiding much that is disagreeable, both in its taste and odour. Some pharmaciens have professed to have discovered methods of depriving the balsam of all that is disagreeable, without, in any degree, injuring its virtues. Copaiba, however, is so much the more efficacious as it is exhibited in a liquid state, and, unless the vomiting or purging which it sometimes induces require an adjunct, it should be administered without combination. In some cases, however, whether exhibited in a solid or a fluid form, it produces so much disgust and nausea, that it has lately been enveloped in capsules, which has rendered it less distasteful, but, perhaps, not so entirely as has been imagined.

When copaiba is given by the mouth, it should not be taken till three or four hours after eating, else it produces great disturbance of the digestive organs. Patients, therefore, generally prefer taking this medicine night and morning. Besides the modes which have been mentioned, some prefer it swimming on the top of a glass of wine or lemonade, or else out of an effervescing saline draught. It is singular, that persons who take copaiba for the first time, especially out of alcohol, often find the medicine pleasant to the taste, but the first eructation destroys the illusion, and gives an entire disgust to a remedy they had found so agreeable.

“Whatever be the mode of exhibiting copaiba,” says Ricord, “it must be owned, it seldom stops the discharge on the instant, ‘d’emblée.’” More commonly, should the discharge rapidly cease, it re-appears on discontinuing the remedy, and again disappears on resuming it, so that, to obtain a durable effect, the patient must continue its use for eight or ten days after the cessation of all discharge. Lallemand, also, concludes that, although large doses of copaiba sometimes succeed in cutting short an acute gonorrhœa, they sometimes augment the inflammatory symptoms, and likewise increase the discharge. The *modus operandi* of copaiba is by absorption, for it affects the urine, like all turpentine, with a peculiar odour.

Another substance, has, for some years, been used for the



abortive treatment of gonorrhœa, or cubebs. This medicine is admitted to offer much fewer chances of success than copaiba, indeed, it seldom stops the discharge at once. It is singular, also, that a substance so powerfully pungent should be taken, in many cases, throughout the whole disease, without apparently influencing its course. The dose is 3j, out of a glass of water or mucilage. These are the means we possess for attempting the cure of gonorrhœa by an abortive treatment.

The abortive treatment, however, is far from being always successful, indeed, it often fails, and sometimes makes every thing worse, nor can we tell the cases in which it will succeed from those in which it will not succeed. Bleeding and purging alone will not effect a cure, and copaiba has been known to the profession, as a remedy for gonorrhœa, since 1702, without our being agreed as to its properties, or the circumstances under which it may be administered with the greatest chances of success. Mr. Hunter thought so little of this remedy that he affirms "there is no specific antidote for gonorrhœa,"—"that treatment is seldom of any kind of use, perhaps not "once in ten cases," and upon the idea that every gonorrhœa cures itself, he adds, "I gave certain patients "pills of bread, and the patients always got well, but some of "them, I believe, not so soon as they would have done had "the artificial methods of cure been employed." These doubts respecting the value of copaiba, the difficulty most persons find of retaining it on the stomach, and, supposing Ricord's method to be the correct one, the utter impossibility of applying a large number of leeches with the secrecy which is usually necessary in these cases, have induced, perhaps, a large majority of practitioners to treat gonorrhœa, in the first instance, as a local inflammation, by simple antiphlogistic, but not active remedies, meeting any severity of symptom as it arises, and in the event of the disease running on to any unusual length, to attempt to arrest it by a local treatment, by injections or by the exhibition of copaiba. Daily experience, indeed, shows that gonorrhœa often terminates spontaneously, and without the aid of medicine, and its usual course, when the patient is continent, abstains from animal

food, and, in a great measure from wine and strong exercise, is to attain its height in a week, to continue in this state a fortnight, or longer, and then gradually to decline, so that, at the end of five or six weeks, the disease terminates. In ordinary cases, therefore, it will be plain that, although much prudence is necessary, still, that much medicine is not essential, and, perhaps, the directions given by Mr. Carmichael are the best we possess on the subject.

“ During the first or inflammatory stage, nothing further  
“ can be done than to lessen the inflammation. This some-  
“ times runs so high as to excite sympathetic fever, and  
“ demands the use of the lancet, but it must be acknowledged  
“ that general blood-letting is seldom necessary, unless ren-  
“ dered so by the imprudence of the patient. In this stage,  
“ I have generally recourse to my favourite solution of tar-  
“ tarised antimony, with or without the sulphate of magne-  
“ sia. This medicine prevents the patient from indulging a  
“ good appetite, lessens inflammation, and is the best pre-  
“ servative against painful erections or chordee. During its  
“ exhibition, the patient is directed to dilute largely, which,  
“ by causing the frequent passage of the ‘ *urina potus*,’  
“ washes off frequently without irritation, the virulent matter  
“ secreted by the urethra.” In the second stage, if it should  
be thought necessary, he directs the use of copaiba, in as  
large doses as the stomach will bear, or of cubebs; but the  
latter medicine, he states, in the majority of cases, has disap-  
pointed his expectations. If the discharge should continue,  
notwithstanding the above measures, recourse should now be  
had to astringent injections. The injections he recommends  
are half a grain to a grain of the oxymuriate of mercury, in  
six or eight ounces of lime water, or from two to four grains  
of the sulphate of zinc, or of sulphate of copper, in the same  
quantity of rose or distilled water, beginning always with the  
smaller proportion. Ricord recommends the acetate of lead,  
nitrate of silver, alum or *Træ opii*.

But injections are without number, every practitioner think-  
ing or wishing to make the world think his own is the best.  
Mr. Hunter’s directions for their use, are probably the best  
we possess. “ I think,” he says, “ irritating injections



“ should never be used, when there is already much inflammation, especially in constitutions which will not bear a great deal of irritation. Nor should they be used when the specific irritation has spread beyond the specific distance. Nor when the testicles are tender—nor when the discharge ceasing quickly, they have become sore—nor when the perinæum is very susceptible of inflammation, and especially if it has formerly suppurated—nor when there is a tendency in the bladder to irritation which is known by the patient having had for some time a frequency in making water. In such cases, I have not succeeded with them ; they not only do no good, but frequently do harm, for I have seen them make the inflammation spread further in the urethra, and I think I have had reason to suspect that they have been the cause of abscess in the perineo. But in cases that are mild, and in constitutions that are not irritable, injections often succeed and remove the disease almost immediately. The practice, however, ought to be attempted with caution, and not, perhaps, till milder methods have failed. Emollient injections are the most proper applications, and where the inflammation is very great indeed, we often find that a solution of gum arabic, milk and water, or sweet oil, will lessen the pain and other symptoms, when the more active injections have done nothing or seemed to do harm.”

When injections are had recourse to, they should be used cold, and thrown up three or four times a-day, with a moderate force. The patient should seat himself on a chair, introduce the pipe into the raised penis, press the lips of the urethra gently, so as to allow the injection to run down the canal, and likewise prevent its regurgitating. As soon as the discharge is stopped, the injection should gradually be left off.

When, in despite of the above treatment, the discharge continues, the disease is now termed “ a gleet.” This usually depends on a morbid irritability of some limited portion of the urethra. This point is sometimes situated towards the meatus urinarius, at others towards the bulb ; and in eight out of ten times, if not always, says Beaumès, towards the prostatic portion of the canal. In this state of parts, says this

gentleman, I know no better mode than that of superficially cauterizing the diseased portion of the membrane. The mode he recommends is to pass a catheter, and after having determined the exact distance of the prostatic portion, by ascertaining the point at which the urine does not flow, to withdraw it. He now introduces an armed catheter, and cauterizes the affected part. Ricord carries this practice still further and cauterizes the whole urethra. When the diseased portion of the urethra, is situated in perineo, much good has resulted from the application of a few leeches, and Vacca, Berlinghiera and Lagneau strongly recommend a blister to the perineum.

When the *testicle* becomes inflamed and enlarged in this disease, quiet and the most complete repose in a horizontal posture, are essentially necessary. The patient, also, should be placed on a low or milk diet. The medical treatment consists in the application of fourteen, twenty, or more leeches, according to the severity of the attack, to the scrotum, and on their falling off, fomentations or a lintseed poultice, should be applied to encourage the bleeding, as well as to assuage the pain, and when the pain is excessive forty to sixty drops of the Træ opii may be sprinkled over the surface of the cataplasm. This treatment often gives the greatest relief in a few hours, but should the pain recur, the leeches should be repeated, and in all cases, the patient should either foment night and morning, or repeatedly change the poultice. Besides the local treatment, internal medicines are of essential benefit, and of these the iodide of potassium, is perhaps the best, and eight or ten grains given three times a day, often greatly accelerate the cure. When mercury is given, it should be in alterative doses, and with or without the sulphate of magnesia, according to the state of the patient's bowels. Under this treatment, the disease is speedily mitigated and generally subsides in ten days or a fortnight. In some cases, however, from improper treatment or from other circumstances, the testicle remains enlarged and greatly indurated. In this state an ointment, composed of



a drachm of the potassii iodidi to an ounce, should be gently rubbed over the affected testicle night and morning. The quantity should be about a drachm. The iodide of potassium still continues to be the most valuable remedy, under these circumstances.\*

When *chordee* exists, it is important to assuage the sufferings produced by this state of parts, and general or local antiphlogistic remedies act powerfully in controlling this symptom. As it generally occurs at night, the bed clothes should be light, and cold applications to the part, or standing on the cold marble hearth, often give immediate relief. But the most powerful remedy is ten grains of camphor and one grain of opium in pills, or in an enema. Ricord says, "I can state, that there are few patients, who have not received benefit from this treatment, and it is asked for every day in the wards of the hospital, by those who have already made trial of it."

In the treatment of gonorrhœa in *the female*, Ricord thinks that astringent applications and injections, if had recourse to within the first two or three days, would, together with copaiba, be successful in stopping this disease; but he admits, that the abortive treatment commonly fails in women. In general, the treatment of gonorrhœa in the female is extremely simple, requiring only rest, diluents, perhaps a weak solution of nitrate of potash, low diet, and frequent ablution. In very rare cases, to lose blood, either from the arm, or locally by leeches, may be necessary. The great adjuvants, however, to this general treatment, are local applications. In the acute stage, emollient injections or an injection of the decoctum papaveris, or else a pledget of fine lint steeped in those fluids, and introduced into the vagina often give great relief. In some cases, however, in which the dilatation of the parts is attended with much pain, fomentations should

\* A practice formerly prevailed, and said to be introduced by Mr. Bromfield, of injecting in acute cases of inflamed testicle, recent gonorrhœal matter into the urethra, for the purpose of reproducing the suppressed discharge. Beaumès, says, he has been called upon to perform this operation lately in two cases, but by no means commends it, and indeed it is generally abandoned.

be substituted for these more direct local applications, and should the bladder be at the same time affected, a large cataplasm may be applied over the abdomen. If, notwithstanding these means, the disease proceeds, and an abscess forms, as it sometimes does on the labia, it should be speedily opened, for the loose cellular tissue of those parts, occasionally allows the pus to make its way to the rectum, producing complete or incomplete fistulous openings. When the acute stage does not yield to these measures, Ricord recommends superficial cauterization by the nitrate of silver.

When the acute stage is passed, astringent injections may be had recourse to, and Ricord recommends the acetate of lead or alum in the proportions of an ounce, to an ounce of distilled water; and, by the aid of injections and pledgets steeped in these solutions, he estimates, that sixty women out of one hundred are cured in the space of twenty days to two months. In still more chronic cases, the injection often requires to be varied and those of zinc, oak, bark, or of hydrargyri oxymuriatis, are among those most commonly substituted. In other cases, Ricord recommends the introduction of a pledget of dry lint.

In cases where granulations have formed, or slight ulceration exists, the diseased portions should be cauterized, either with the nitrate of silver, or with the nitrate acid of mercury.

The internal surface of the uterus is like other portions of the genital mucous membranes, often the seat of a chronic discharge, but, although powerful injections applied to the orifice of the neck of the uterus seldom cause pain, still, when thrown into the cavity of the uterus, they often produce grave and unpleasant accidents. Ricord states that one part of nitrate acid of mercury,\* to eight parts of water, produced attacks of intense hysteria. A more dilute solution, however, or one part of nitrate acid of mercury to twelve parts of water, has cured the patient, and only slightly affected the nervous system—and he found also that an injection composed

\* Nitrate acide de mercure, is the expression used by Ricord, p. 688. There are so many preparations of this description, however, that it is impossible to determine the particular one in question.



of six grains of nitrate of silver to an ounce of distilled water cured the patient after three injections, each at a week's interval, without the slightest accident.

It is generally admitted, that medicines have little efficacy in the treatment of gonorrhœa in the female. The secale cornutum produces no beneficial result, or only in those few cases in which the discharge proceeds from the uterus. Neither do copaiba nor cubebs influence, in any degree, the discharge from the vagina or uterus, and if they possess any beneficial property, it is only in those few cases in which the urethra is affected.

Emollient fomentations and injections should be used warm, but astringent injections should be used cold. They should be thrown up by means of a syringe with a bent pipe, terminating in a bulb pierced with holes. And the pipe should be of that length, that it may be introduced into the vagina without hurting the neck of the uterus. The position of the patient is not indifferent, for Ricord says, that he has placed a portion of lint on the neck of the uterus, and found that it was not in the slightest degree stained when the party injected coloured fluids, standing, or sitting on a bidet. The patient, therefore, should be recommended to inject in bed, and with the pelvis raised.

In the treatment of *gonorrhœal ophthalmia*, "The first principle to be established is," says Ricord, "that the means be active, and their employment early, for any hesitation or uncertainty frequently occasions the loss of sight." His directions are as follows:

"The party should be recommended to avoid every thing that can, directly or indirectly, irritate the eye, and especially to avoid all further introduction of the gonorrhœal matter. If the patient be strong, blood should be taken from the arm, and thirty, forty, or fifty leeches should be applied on a level with the alæ of the nose, also on the temple, and in the course of the jugular vein, on the diseased side, taking care, carefully to avoid the eye-lids. This being done, the eye-lid is to be everted, and the palpebral conjunctiva cauterized with the argenti nitratum, until

“the surface is whitened, and then the ocular conjunctiva  
“should be submitted to the same operation, but only more  
“slightly and superficially.

“After this cauterization, which, to be successful, ought  
“not to be deep, cold water should be immediately injected  
“between the eye-lids, so as not to allow the nitrate of silver  
“to remain on the cornea. As soon as this slight operation  
“is ended, the eye should be covered with compresses  
“steeped in a cold decoction of poppy heads. In this grave  
“ophthalmia, also, as there is danger of the pupil adhering,  
“the extract of belladonna should be applied round the base  
“of the orbit, and up the nostril on the diseased side to  
“prevent its contraction.

“If ecchymosis exists, and which is followed very con-  
“stantly by destruction of the cornea, we should, without  
“hesitation, excise it, raising up the mucous membrane by  
“means of hooked tenacula, and removing the raised portions  
“by means of curved scissars. If the part be hard, so that  
“the portions raised are small, we must reckon with dimi-  
“nished confidence on the result. An œdematous ecchymosis  
“is infinitely more amenable to treatment than a phlegmenous  
“ecchymosis.

“Whether excision be or be not practised, it is necessary  
“to persist in cauterizing the eye with the *argentum nitratum*,  
“in the manner described. When the application is success-  
“ful, the secretion, from muco-purulent, becomes sero-san-  
“guinolent. After this, the swelling of the eye-lids diminishes,  
“the congestion and inflammation of the conjunctiva subside,  
“and the disease terminates by resolution. Sometimes, how-  
“ever, a blister or a seton to the neck is necessary to effect  
“this result, or some collyrium, among which, one composed  
“of a grain of *argentum nitratum* to an ounce of water has the  
“most chances of success.”

“If the disease continues, and the puriform secretion is  
“unabated or increases, we must again have recourse to an  
“application of the *argentum nitratum*, which should be re-  
“peated every day, or every second day, and, in children, I  
“have sometimes applied it twice in the same day.”



“ At the same time, we employ this energetic treatment  
“ as often as the intensity of the symptoms demands, and  
“ without waiting to be passive spectators of the mischief  
“ which must result from delay; we must keep the bowels  
“ freely open, and, by a powerful revulsion, diminish all  
“ tendency to cephalic congestion.

“ Although the gonorrhœal discharge may be, for a moment,  
“ diminished, it is never completely suspended; or should it  
“ be so, we may affirm, in spite of the opinions entertained to  
“ the contrary, that no benefit arises from renewing it.  
“ Copaiba, cubebs, &c. have no power over this disease, nei-  
“ ther has mercury, or any other anti-syphilitic medicine.”

The treatment of strictures and of diseased prostate are so completely within the province of surgery, that the reader is referred to the popular works on that branch of medical science for the methods usually employed in the cure of these cases.

## HYDROPHOBIA.

Hydrophobia is a simply contagious disease propagated by the bite of those animals in whom it originates spontaneously, but is not communicated by man, or by those animals in whom it exists only by inoculation. The action of this poison is principally on the brain, and eighth pair, causing a peculiar dread of swallowing fluids, which is the characteristic symptom of the disease. Its duration is from a few hours to three or four days.





## OF THE POISON OF HYDROPHOBIA.

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MUCH speculation has been entertained whether hydrophobia is of such antiquity as to be mentioned in the writings of Homer,\* but all authors are agreed that it was known to Aristotle, and subsequently to Celsus, Pliny and Galen.

Hydrophobia, as it appears in the dog, is marked by some singular departure from his ordinary habits, such as picking straws, threads, or small bits of paper from the floor and swallowing them, licking the noses of other dogs, or other cold surfaces, as stone or iron. Besides this, he is observed to be lonely, shy and irritable, is less eager for his food, or refuses it altogether. His ears, also, and tail drop, his look is suspicious and haggard, and sometimes, from the very commencement, there is a slight redness and watering of the eyes. In a short time, saliva begins to flow from his mouth, and passing by degrees into a viscid foam, impedes his respiration, which becomes difficult and panting, and his tongue hangs out of his mouth. Fever comes on, and his fauces are said to be inflamed, but although irritable and easily provoked to snap at objects, he still obeys the voice of his master. “It is remarkable, also,” says Mr. Youatt, “that the dread of fluids, and even the sight “of them, so striking a symptom in man, is often wanting in “dogs and other animals, for many dogs lap water during the “disease.” In many dogs, the symptoms never rise higher than these, but in others, there is a repugnancy to control, and a readiness to be aroused to extreme rage on the appearance of a stick, whip or other instrument of punishment, or at any

\* *Ἐκτωρ δὲ μέγα σθένει βλεμεάινων  
Μαίνεται ἐκπάγλως, πίσυρος Διὶ, οὐδέ τι τίει  
Ἀνέρας, οὐδὲ θεοῦς κρατερὴ δέ ἐ λύσσα δέδυκεν.*

*Iliad*, ix. 23.

*Τούτον δ' οὐ δύναμαι βαλέειν κύνα λυσσητῆρα.*

viii. 299.



attempt at intimidation, which strikingly characterises the disease. Even in this state, however, he seldom fights a determined battle, but bites and runs away. This irascibility occasionally ends in indiscriminate aggression and unprovoked fury; and the rabid dog now flies at every creature he meets, bites all other dogs on his way, or if tied up, gnaws the wood of his kennel, or should he gain admission into a field where sheep, goats, cattle, hogs, geese, or other timid, unoffending animals are collected, he tears and pursues every individual of the flock he approaches. The cat is an early object of his rage, and even the horse and elephant have sometimes sunk under the baneful effects of his bite. The animal, at length, dies, and apparently by convulsions.

Inspection of the dead body has often shown that the animal has died from mere nervous excitement and functional derangement, for Magendie has examined the dog and found nothing. In all other cases, when the poison has had time to set up all its specific actions, the medulla oblongata is vascular, and its membranes injected. The principle lesions of structure, however, are found in those parts, supplied partially or entirely by the eighth pair, for the tongue is swollen, and the arch of the palate, the tonsils, the whole indeed of the fauces, the salivary glands, and the angle at the back of the larynx behind the epiglottis are invariably inflamed. The bronchial membrane is, also, occasionally highly inflamed, and the bronchial tubes, and lower part of the trachea filled with a viscid or bloody spume—and, in a few instances, also, the substance of the lungs is inflamed. The stomach, likewise supplied by a branch of the eighth pair is invariably inflamed, the inflammation being either confined to the rugæ, or occupying a more considerable portion of the mucous coat. Occasionally it is confined to the cardiac portion, or is more intense there, but, in a few instances, it extends with the deepest intensity over the whole of the stomach. The stomach often contains a strangely mingled mass of straw, hay, hair, horse-dung and earth, shewing the singular morbid propensity of the animal, or being void of these substances, contains a fluid resembling the deepest

coloured chocolate mixed with olive, which stains the mucous coat, or else, is still darker like coffee, but this does not communicate a stain. If there be much inflammation of the stomach, it often extends to the duodenum, and occasionally to the small intestines. The brain seldom shows much increased vascularity, but its membranes usually are more or less congested. It is remarkable, however, that the medulla oblongata, which gives origin to the eighth pair, is, in every case affected, its substance being vascular, and the membranes at that part congested, generally speaking no decisive trace of disease is to found in any part of the vertebral canal.\*

As far as our knowledge extends of the habits of this poison, no animal, except those of the canine and feline races, are subject to spontaneous hydrophobia. The dog, the fox, the wolf and the jackall, comprise the different species of the genus *canis*, and in all these, the disease may originate either spontaneously or by inoculation. The cat suffers in the same manner from both causes, and is the only animal of its kind at present known to have this two-fold liability.† The animals that have been mentioned when labouring under this disease, in whatever manner contracted, generate a poison which is contagious and capable of propagating hydrophobia, probably to all warm blooded animals, certainly to every domesticated animal, birds as well as beasts, and also to man. Happily, however, man, and those animals in which hydrophobia does not originate spontaneously do not secrete the poison, and, consequently, are incapable of further communicating the disease.

*Remote causes.*—The most popular notions respecting the remote cause of hydrophobia, in those animals in whom it originates spontaneously, is, that it is excited by great heat, as that of the “dog days,” and hence the custom, in our

\* Youatt on Canine Madness, p. 4, 5, 6.

† Of one hundred and forty-nine rabid animals, twenty-six were wolves, nine were cats, and one hundred and fourteen dogs.—Magendie Journal, p. 337.



own, and in most other countries, of the keeping within doors, the tying-up, muzzling, and killing of dogs during the annual panic of the hot season. M. Troillet, however, has shown, that the greater number of animals become rabid in May and in September, certainly not the hottest months of the year. It has been thought, if the hot weather is not the cause, the *æstus veneris* and the nervous excitement of those periods might produce it; but, according to the same authority, cases of canine madness occur in every month in the year; and, taking the seasons altogether, nearly with equal frequency in the winter, the spring, and the autumn, as in the summer. Other pathologists have imagined that this disease might be caused by a long privation of water, or by feeding upon putrid flesh, or other immundities, but it occurs in the lap-dog, and other delicately fed and pampered animals, as well as in the ravenous wolf. It is, also, well known that Dupuytren, Magendie and Breschet, have kept dogs in the most disgusting filth, fed them on carion, deprived them for a long time both of water and of food, so that they have either died or devoured each other, and yet they have not been able to excite hydrophobia or any disease of that kind. The remote causes of hydrophobia, it must be admitted, are, then, entirely unknown. They are not peculiar to any given country, for the disease equally exists in Europe, Asia, America, and, probably, also, in Africa; neither are they peculiar to climate, since it prevails, not only in the frozen regions of Canada, but, also, in the East and West Indies. The remote causes, however, appear most active in those countries where the dog attains the greatest perfection, for hydrophobia is more frequent in England, in the northern parts of Europe, and in Canada, than among the dwindled races more to the south, and between the tropics. In Jamaica, for instance, and more particularly in the towns, dogs are, perhaps, more numerous in proportion to the number of inhabitants, than in any other part of the world, it being the ambition of every negro to be master of a dog, “yet,” says Dr. J. Hunter, “forty years have elapsed without a single dog being known to go mad.”\*

\* Med. Chir. Trans., vol. i., p. 295.

The dog also abounds in Egypt, and is held in such superstitious veneration that it is never destroyed, but the inhabitants assured Baron Larrey,\* they had not seen hydrophobia, either in man or in any lower animal.

In man and in the large class of animals, whom hydrophobia affects only by inoculation, the remote cause is unquestionably the bite of the rabid animal, in whom it originates spontaneously.

*Predisposing causes.*—The susceptibility to this poison is by no means universal either in man or animals. In order that this virus may produce its specific effects, some peculiarity of idiosyncrasy or some of those inexplicable circumstances termed predisposing causes are necessary. The chances of exemption after the bite of a rabid animal, may be calculated from the following data, or at least, an approximation may be made to the truth. “Four men and twelve dogs,” says Dr. John Hunter, “were bitten by a rabid animal, “every one of the dogs died, while all the men escaped, although they used no other precaution, than such as we see “every day to be fruitless. In another instance, twenty persons “were bitten by the same mad dog, and yet, only one took “the disease.” But the chances of escape are rarely so many—of fifteen persons bitten by a rabid wolf in the Maçonnais, eight perished of hydrophobia; of twenty-four bitten, likewise by a wolf, near Rochelle, eighteen perished;† of twenty-one by another wolf, sixteen died of rabies canina. In 1812, nineteen persons were bitten at Bar sur Ornain, when twelve died of the usual symptoms within twelve months after the accident;‡ of twenty-three persons bitten in 1817, thirteen fell victims to this terrible distemper, while a fourteenth, whose scalp had been torn off his head, died of inflammation of the brain.§ Even these chances of escape are diminished in many cases, for, “in June, 1765,” says

\* Vol. ii. p. 226.

† Andery.

‡ Gazette de Santé, 1813.

§ Troillet.



Boudet, "five persons were bitten by a raging wolf near Autun, and all died rabid, notwithstanding the use of mercurial frictions." Again, of ten other persons bitten near Nolay in Burgundy, nine died, and of the same dreadful symptoms. These data give, of animals and men bitten, a ratio of one hundred and fifty-three bitten, to ninety-four dead; or, in other terms, the chances of escape are as three to two nearly.

Of the cases which have fallen under my own observation, the chances have been equal. A few years ago, a man was brought into St. Bartholomew's Hospital, labouring under Hydrophobia, bitten in the act of saving his child, a boy of about six years old, from an attack of a rabid cat, which had flown at him, and deeply wounded him in the face. The man died of hydrophobia, while the child, though first bitten, escaped. Some months ago, a man was admitted into St. Thomas's Hospital, having been bitten by a rabid dog, at the same time, with another man, and, as the latter party had died of hydrophobia, he was allowed to remain for many weeks, till all apprehension of danger had subsided, when he left the house.

It has been thought that the immunity of the parties escaping, might not arise out of any want of susceptibility in their constitutions to the actions of the poison, but to the circumstance of the dog's tooth being wiped clean from all venom by biting through their clothes. Menière, however, says,\* that in seven fatal cases he had witnessed, the dog must have bitten through many folds, proving the little importance of dress for the protection of the patient.

In the human subject, the predisposition to this disease is so general that neither age nor sex, exempt a bitten party from hydrophobia; for it has been observed in the infant at the breast—often in children under eight years of age, and also at every period of adult age. An instance is mentioned † of a man sixty years of age who died of the disease. A case, also, is given in the American Philosophical Transac-

\* Archives Générales, vol. xviii, p. 545.

† Medical Gazette, Dec. 27th, 1828.

tions of a man who had attained his seventy-third year being bitten, and he also died. So if old age has been less frequently affected than the more active periods of life, and women also less frequently than men, it is because such persons are less exposed to a rencontre with a rabid animal.

*Contagious.*—The contagious nature of hydrophobia is distinctly proved by the disease arising in classes of animals admitted not to be spontaneously liable to it, and then only in consequence of inoculation by the bite of a rabid animal. In order, however, to demonstrate the existence of a hydrophobic virus, and to prove that the disease is not merely a consequence of the mechanical injury or laceration of the parts by the tooth of the animal, Dr. Zine has inoculated several animals with the saliva of a rabid dog, recently dead, and in this manner he infected a dog, a cat, a hare, and a cock. Professor Dupuy has also produced this disease by causing a sponge to be bitten by a mad dog, and then rubbing it on the open sore of a sheep. Mr. Youatt, also, has drawn a silk thread backwards and forwards through the mouth of a hydrophobic animal, and then inserted it as a seton in the neck of a sound dog, which subsequently died of hydrophobia. It seems proved, therefore, that hydrophobia is not the result of local or constitutional irritation, but the effect of a morbid poison, existing in the saliva of rabid animals of the cat and dog kind, and capable of communicating the affection, as it is asserted, at all periods of the distemper.\*

But although it must be admitted that animals of the dog kind and the cat do secrete a venom in the rabid state that produces hydrophobia, still there are strong reasons for believing that other classes of animals in whom the disease does not originate spontaneously, but only exists in consequence of inoculation, do not generate this peculiar poison, and consequently are incapable of communicating the disease. At the

\* “Some years ago,” says Dr. Bardsley, “almost all the dogs at St. Domingo were affected with hydrophobia by the bites of rabid animals brought from America; and it has since been repeatedly traced to infection from that quarter.” Heims has shown that hydrophobia is not infectious by chaining up healthy animals in the same room with rabid ones, but without any result.



veterinary school at Alfort, three sound healthy sheep, two dogs, and also a horse were inoculated with the saliva of a rabid horse,\* but not one of these animals was infected. Dupuy has, likewise, seen rabies in several flocks of sheep in consequence of the bite of a rabid dog or wolf, yet the disease has not been communicated, although the sound sheep has often been bitten by the infected, and that in places stripped of wool. This physiologist has tried to produce the disease in cows and sheep by rubbing their sores with sponges dipped in the saliva of rabid animals of their own species, but without success. Notwithstanding, also, the many instances in France of rabid wolves attacking cattle which have afterwards died of hydrophobia, there is no well authenticated example of the disease spreading, though a tendency to bite is one of the most striking features of the complaint. The great body of facts, therefore, is altogether against the hypothesis of herbivorous animals communicating the disease, and consequently of their secreting the hydrophobic poison.

The subject of the non-contagious nature of hydrophobia in herbivorous and in other animals not liable to its spontaneous attacks, assumes a higher importance, as it involves the question whether the saliva of a patient labouring under the disease is capable of infecting healthy persons. The general evidence, however, as well as many particular facts, are altogether against the possibility of such an event, for no instance is known, during the many hundred years that hydrophobia has been studied, of that disease having been communicated from one human being to another. There are even many instances of the attendants having been bitten by the patient in the violence of the paroxysm, and other accidents must have occurred by which they must have been inoculated with the saliva, and yet no case is to be found on record of the disease having been communicated under these circumstances. In a case, for example, of a woman labouring under hydrophobia, and admitted into St. Bartholomew's Hospital under Dr. Powell, the patient rushed, in a moment of ungovernable fury, at Mr. Wheeler,

\* Magendie, *Journal*, vol. viii, p. 329.

the apothecary, and deeply bit him. Also in a similar case, which occurred under Dr. Hue at the same hospital, the patient, an exceedingly powerful person, having fallen into a violent epileptic fit, an attempt was made to bleed him, but the convulsions were so strong, that the dresser, unable to control the arm, punctured his hands which were covered with the saliva which flowed from the patient's mouth, and yet neither this gentleman nor Mr. Wheeler suffered any inconvenience in consequence.

Many direct experiments have likewise been made, both in this country and in France, to prove the contagiousness or non-contagiousness of saliva taken from patients when labouring under this disease. The first were made by Drs. Vaughan and Babington, when the animals inoculated did not take the disease; and every subsequent experiment of this kind failed, till on the 19th of June, 1813, Magendie and Breschet obtained a different result. These physiologists took some saliva directly from the mouth of a man labouring under hydrophobia in the Hôtel Dieu, at Paris, just before he expired, and with this fluid they inoculated two, as they imagined, healthy dogs. On the 27th of July following, however, it unfortunately happened that one of these animals became rabid and bit two other dogs, one of which died mad. This experiment, it must be admitted, throws some doubt on the innocuous nature of human saliva in this disease, still it is by no means conclusive, for the dog might have been bitten and infected previous to the inoculation, or as the disease was rife, might have been attacked spontaneously. The experiment has not since been repeated, but when the occasion does offer, it is extremely desirable it should be so; for the only mode of demonstrating the contagiousness or non-contagiousness of human saliva, is to multiply these experiments, not only in dogs, but also, in order to simplify the problem, in other animals not liable to spontaneous hydrophobia. It is impossible, therefore, to admit that one single exception has overthrown the multiplied experience of many years, that human saliva is incapable of communicating this disease.



Although the contagious nature of the hydrophobic saliva in the dog kind, and in the cat has been proved to demonstration, yet some difference of opinion has been entertained as to the particular organ by which the virus is secreted. It is generally supposed to be secreted by the salivary glands, but Dr. Gillman has disputed this act, and contends that it is secreted by the stomach; while Troillet imagines that it is by the tracheal and bronchial membrane. Mr. Youatt, however, is of opinion, that by whatsoever organ secreted, the virus is of so great delicacy, that the saliva impregnated with it, quickly loses the property of infecting; so that he doubts whether saliva taken from a dog, recently dead, can produce the disease. If, however, the following facts relative to the infection of fomites can be relied on, they would seem to disprove the experience of Mr. Youatt.

*Fomites.*—The communication of hydrophobia by fomites is distinctly proved by the cases which have been given of the disease having been produced by inoculation; the dog's tooth is, indeed, a fomite. In the following instance, the disease appears to have been extensively communicated by this means. Mr. Trevelyan in correspondence on the subject of hydrophobia with Dr. Bardsley, states that after losing one pack of hounds by this disease, he not only removed the straw, but had the benches of the kennel scalded with boiling water, and afterwards all the joints painted and filled up with hot tar; the walls were then whitewashed, and the pavement cleaned with hot water. Thus secure, as he imagined, he collected another pack, yet rabies broke out year after year. In consequence of these continued attacks, he removed the pavement, threw the earth on which it was imbedded into the river, refitted, new painted and whitewashed the kennels, and ever since the pack had continued perfectly healthy.

*Co-exists.*—No instance illustrative of this law is yet known.

*Modes of absorption.*—This poison is, probably, absorbed equally by the cutaneous and mucous tissues, but it is probable that an abrasion is necessary. The ancients were

aware of this, for Celsus observes that the integrity of the lining membrane of the mouth is necessary to the operation of the psylli, whose office it was to suck out the poison after the bite of a rabid dog, and Dioscorides expressly orders them first to wash their mouths with astringent wine, and afterwards to lubricate the cavity with oil. “With regard to dogs,” Mr. Meynell observes, “that such of them as have been thought “to become affected, merely by the contagion of the same “kennel, will generally be found, upon minute examination, “to exhibit the marks of bites, although concealed by the “hair from observation.”\* When a scratch or other abrasion exists, the rabid dog merely licking the part, is sufficient to infect the patient. Dr. Bardsley mentions the case of a shepherd, in which the disease occurred after the common interval, though the dog merely licked his hand, but the dog was rabid. The poison being absorbed, probably infects the blood; but the proof of this hypothesis rests upon the general argument, that the poison of hydrophobia follows the general laws of other morbid poisons.†

*Period of Latency.*—After the poison has been absorbed, it lies in latent combination with the blood from a few days, to twelve or more months. Much difference of opinion prevails as to the extreme periods. Hamilton doubts whether a single well-authenticated case of hydrophobia has occurred so soon as the tenth day after the bite. Dr. Parry, however, thinks it has taken place as early as the second or third day; and Dr. Elliotson says,‡ he has reason to believe it has occurred at a still shorter period. Troillet, says two weeks had hardly elapsed after an irruption of a rabid wolf into the Lyonnais,

\* Cyclopaedia of Practical Medicine: art. Hydrophobia.

† It has been stated by a popular writer, (Travers on Constitutional Irritation), that Mr. Youatt has communicated hydrophobia by injecting the blood of a rabid animal into the cellular tissue of a healthy one; but this is probably an accidental error, for neither that gentleman, nor Dupuytren, nor Breschet, nor Magendie, have been able either by rubbing the wounds with blood taken from the rabid dog, or by injecting it into the cellular tissue, or into the veins of a sound animal to produce the disease.

‡ Principles and Practice of Medicine, p. 499.



than hydrophobia appeared in some of the cattle, and in some of the persons who had been bitten; and this period is, perhaps, the shortest of any well-authenticated case on record. There can be no doubt that the statements of Morgagni, who speaks of twenty and even of forty years having elapsed between the time of the bite and the breaking out of the disease must be erroneous, but the extreme length is often great. There are many instances of twelve months elapsing; and a case is given by Mr. Grant in the *Medical and Physical Transactions of Calcutta*,\* in which fifteen months were said to have elapsed from the time of the bite, but on inquiry, he imagines twenty months must have been the true period. The extreme periods determined by Dr. John Hunter, were thirty-one days and eighteen months, and it is probable this is an approximation to the truth. It is agreed, however, by all writers that the mean period of latency is about forty days in the human subject. In the dog, the period of latency is supposed to be shorter than in man, but this is not well ascertained. Lord Fitzwilliam's pack were bitten by a rabid animal, and the disease appeared at various intervals, from six weeks to six months. At the veterinary school at Alfort, it is usual when a dog has been bitten, to chain him up for fifty days, and at the end of that period, if he continues in health, he is restored to his master; not that he is now considered as absolutely exempt from danger, but that his chances of escape are greatly increased.

*Pathology.*—The theory of this disease is, that the poison is absorbed, and infects the blood, and that after a period more or less long, it produces functional derangement of the brain and nervous system, and, subsequently, organic alteration principally of the structures supplied by the eighth pair. The action of the poison, in the first instance, is on the œsophageal branch of the eighth pair, producing that derangement of function, which gives rise to the characteristic symptom of the disease, or to the extreme difficulty of swallowing, es-

\* Vol. ii, p. 51.

pecially of fluids, and, perhaps, also from the spasmodic catching of the breath, consequent even on touching the lips with liquid prove that the recurrent nerve is equally affected. Subsequently, also, the eye and ear, distressed by every ray of light or impulse of sound, together with the agitation and irritability manifested on the slightest breath of air passing over the surface of the body, distinctly show that the cerebral and spinal nerves must be affected, either at their origin or termination. In a still more advanced stage, the state of suspicion and irritability, not only amounting to violent and uncontrollable derangement, but sometimes bringing on epilepsy and convulsions, terminating in death, show that the mind is singularly affected, and, consequently, that the brain, generally, must likewise be the seat of action of this terrible poison.

That these symptoms are the result of mere functional disturbance, is proved by Dr. Gillman and many other eminent pathologists, having often remarked in cases where the action of the hydrophobic virus has been so rapid, that death has been produced in a few hours, that not a vestige of inflammation or other morbid phenomena have been discernible, either in animals or in man on posthumous examinations. More commonly, however, some structural alterations have been found limited to the brain, the chord and their membranes, and to the structures supplied by the eighth pair. These parts may be either conjointly or separately affected; but, according to the law of election, which seems inherent in all poisons that act on more membranes than one, the stomach and œsophagus have sometimes been found healthy, when the laryngeal, tracheal, or pulmonary tissues have been found diseased, and, on the contrary, the pulmonary tissues have been found healthy, when the stomach, &c., have been diseased—facts, in no degree dissimilar to what has been observed in whooping-cough, fever, and many other affections. According, however, to the most competent authorities, these morbid appearances are, in almost every instance, trifling in degree, and by no means sufficient to account for the violence of the



symptoms, or the death of the patient; for the congestive states of the brain, the chord and their membranes, as well as of the lungs, are often the mere consequences of the long continued violent convulsions which have preceded the fatal catastrophe, and might have been predicted, *a priori*. It is doubtful, however, whether the actions of the poison end here, for it will be seen in a case treated by Magendie, and prolonged beyond the usual period, that suppuration of the synovial membranes of the joints took place, and produced a state of suffering which was remarkable, even in this frightful disease, and far more terrible than death itself. Perhaps the best *abrégé* of the morbid appearances, has been given by Dr. Bardsley, in his very able account of this disease in the Cyclopædia of Medicine.

The *head* has been examined with much attention. In some instances, the membranes of the brain have been found congested, and of a darker hue than usual. The capillaries of the tunica arachnoidea and pia mater have also been met with minutely injected with blood. This state of these membranes occurred in a case published by Dr. Marshall, as well as in several others on record. Troillet has noticed the gorged condition and dark colour of the plexus choroides. Effusion of serum has been observed between the dura mater and tunica arachnoidea, between the latter membrane and the pia mater, and between the pia mater and the brain, and also in the ventricles. The substance of the brain itself has been detected in a harder state than natural, in one or two instances; in others, it has been found to have undergone a certain degree of *ramollissement*. Both Bonetus and Lieutaud, however, have alluded to cases in which this organ presented no marks of disease.

Inflammation of the pharynx and œsophagus have been noticed in several dissections of hydrophobic patients, but cases are on record in which no inflammatory appearance in these parts has been observed. On examination of a patient of Dr. Rutherford's, who died of rabies canina, Dr. Munro was unable to detect any morbid alteration, either in the pharynx, œsophagus, larynx, stomach or intestines. In one instance, it will be shown that we met with an

abrasion of the internal membrane of the œsophagus. In a fatal case of this disease, too, related by Dr. Ferriar, a morbid appearance presented itself in the lower part of the œsophagus, about two inches above the cardia, the epidermis of the œsophagus was abraded in irregular points, and exposed an inflamed surface of a dark red colour; still lower, the abrasion became linear and extended into the stomach itself. The edges of the epidermis surrounding the abrasion were unequal and ulcerated. A similar affection was traced along the lesser curvature, but growing fainter in its progress to the pylorus, where it was least discernible, and about which it seemed to terminate. The whole of the inflamed parts bore a striated appearance, resembling the effects of corrosion, darkest in the œsophagus, and lighter and more distinct towards the pylorus. In two cases mentioned by Dr. Vaughan, no inflammation of the œsophagus appeared on dissection. The internal coat of the stomach has been discovered in a highly inflammatory state, in not a few instances of rabies, and dark pimple-like effusions have been observed upon it. This organ has been found also to contain a smaller or greater quantity of coloured matter. It has been supposed that this inflammatory condition of the mucous membrane of the pharynx, œsophagus, and stomach, satisfactorily accounts for the sense of suffocation, extreme thirst, morbid antipathy to liquids, and burning heat along the whole of the œsophageal tube, mostly experienced by the hydrophobic patient. But it must be recollected that such a state of these parts is by no means constantly present, as is proved by the cases related by Dr. Hamilton and other writers, and hence it is not essential to the existence of the disease.

From the examinations of Mr. Troillet, it appears that the mucous membrane of the trachea and bronchi, afford evidence of inflammatory action, being covered over with a considerable quantity of frothy mucus. Alouette has also noticed this peculiar frothy matter in the trachea and bronchi. That the lining membrane of the trachea and bronchi is sometimes in a state of inflammation, cannot be denied, but we are satisfied that Troillet's view of the patho-



logy of rabies is too limited, for it will be found, on a comparative examination of the number of dissections of hydrophobic patients on record, that the stomach has been more frequently found in a morbid state than the trachea, bronchi, or any other part of the body. The salivary glands have occasionally been observed of increased size and vascularity. In some instances, there has been inflammation of the pulmonary tissue, but more frequently great venous congestion.

Some pathologists of eminence, as amongst whom may be mentioned the names of Salin, Brera, Saunders and Reid, supposed that they had satisfactorily proved that the symptoms of hydrophobia proceed from a morbid condition of the spinal marrow, but it may be correctly stated that their opinions have not been confirmed by the general experience of the profession. In some examples of this disease, unequivocal marks of vascularity of the membranes of the spinal chord have been present, but, generally speaking, not the least vestiges of inflammatory action, either in the medulla spinalis, or its investing tunics, have been discovered. In one instance, related by Mr. F. Goodrich, the whole chord was considerably inflamed, and opposite the two last cervical and dorsal vertebræ, the cellular substance was studded with dark patches of coagulated blood, the theca vertebralis thickened, and the chord in an active state of inflammation. We may, however, venture to assert that no such connection as that of cause and effect exists between an inflammatory state of the spine and the phenomena of hydrophobia, for it is well known that effusion of serum into the theca vertebralis, and other signs of increased vascular action in the spine, have been frequently met with in diseases very different from that under consideration.

*Symptoms.*—The injuries inflicted by hydrophobia on animals do not, in general, involve any extensive laceration of parts; the animal snaps and bites, and passes on, seldom making a continued attack. In a few cases, however, there is more steadiness of purpose, and the lacerations inflicted are deep, large, and frequently repeated. In a case mentioned by Dr. Hamilton,\* the man had a large wound in

\* P. 325.

the throat, which laid the trachea quite bare for a considerable extent; also one on the cheek, which enlarged the mouth full an inch, a smaller one on the chin, and another, but lower than the former in the throat. In general, however, these injuries, where the bitten part has not subsequently been cut out, are followed by no other symptoms except those which are found to arise from the bite of the most healthy animal. The wound, whether dressed or neglected, heals up kindly leaving a cicatrix, and the patient suffers no derangement of health beyond that momentary despondency, which so untoward an event is calculated to excite.

A few weeks or months having elapsed, the *first stage* commences, and the patient's attention is aroused, perhaps, by a pain felt in the cicatrix, sometimes severe and sometimes trifling, which in some cases, shoots up the bitten limb. In a case given by Dr. Bardsley,\* the sensation in the bitten part, the thumb, was that of torpor, together with such extreme rigidity, that it could not be bent, while pain was felt in the shoulder and neck. In general, the pain has been observed to follow the course of the nerve, and to shoot towards the heart. In a case given by Mr. Oldknow of Nottingham, in the fifth volume of the Edinburgh Journal, the patient, though bitten in three distinct places, namely: the scrotum, the thigh, and the left hand, which was last bitten, still felt no uneasiness, but in the left arm. Pain, however, is by no means constant, and the relative frequency with which it is present or absent, is not yet ascertained. In some cases, the wound is said to have opened. At this early period, moreover, the mind is oftentimes affected, and the patient is more depressed or excited than usual. In addition to these symptoms, there is sometimes a sense of chilliness, a momentary flushing, head-ache, or a slight attack of fever. These premonitory warnings last but a few hours, or, at most, but a few days, when the fatal, but characteristic symptom of difficulty of swallowing, a symptom which dis-

\* Cyclopedia of Practical Medicine.



tinguishes this malady from all others affecting the human frame appears, and the hydrophobic stage commences.

The *second, or hydrophobic stage*\* is ushered in with a great difficulty, if not utter impossibility of swallowing any liquid. This symptom generally comes on suddenly, and is discovered accidentally, for on attempting to drink, such horrible sensations follow, that whatever afterwards recalls even the idea of swallowing, excites violent agitation and aversion. Some patients, who are able to give some account of themselves, describe the hydrophobic sensation as a rising of the stomach which obstructs the passage—others, as a feeling of suffocation, a sense of choaking, which renders the act of swallowing impossible; and it is very observable that every attempt to pass the liquid over the root of the tongue, excites convulsions in the larynx and pharynx, and also of the muscles of the abdomen. They complain, likewise, of a sense of great oppression at the chest, and often sigh. In a case given by Drs. Brown and Adam,† in which the pain up the arm was excruciating, the patient said, “though “there is something heavy on my breast, all the difficulty,” pointing to his throat, “lies here.” “In this state,” says Dr. John Hunter, “the patient finds some relief from running “or walking, which shews that the lungs are not as yet the “seat of any great oppression.”

The dread of swallowing fluids, however, exists in very different degrees, for some patients will not only make the attempt, but even force down a mouthful or two, or even succeed in drinking; while in others, the mere sight of a fluid throws them into convulsions. An extract from Dr. Marcet’s case,‡ will show the extremity of suffering caused by this symptom. “On our proposing to him to drink, he “started up and recovered his breath by a deep convulsive

\* It has been thought that those bitten by cats have seldom the dread of water or difficulty of drinking it. But in Dr. Vaughan’s case, the boy “sobbed deeply at the sight of water, turning away with perturbation.” Mr. Bellamy and the patient described by Dr. White, were both distinctly affected with hydrophobic spasms, and a case also in St. Thomas’s was similarly affected.

† Med. and Physical Trans. of Calcutta, Vol. ii, p. 64.

‡ Medico Chirurg. Trans., vol. i., p. 158.

“inspiration ; yet he expressed much regret that he could  
“not drink, as he conceived it would give him much relief,  
“his mouth being extremely parched and clammy. On his  
“being urged, however, to try, he took up a cup of water in  
“one hand and a tea-spoon in the other. The thought  
“of drinking out of the cup appeared to him intolerable, but  
“he seemed determined to drink with the spoon. With an  
“expression of terror, yet with great resolution, he filled  
“the spoon, and proceeded to carry it to his lips, but before  
“it reached his mouth, his courage forsook him, and he was  
“forced to desist. He repeatedly renewed the attempt, but  
“with no more success ; his arm became immoveable when-  
“ever he attempted to raise it to his mouth, and he strug-  
“gled in vain against this spasmodic resistance. At last,  
“shutting his eyes, and with a kind of convulsive effort, he  
“suddenly threw into his mouth a few drops of liquid, which  
“he actually swallowed, but at the same instant, he jumped  
“from his chair, and flew to the end of the room, panting  
“for breath, and in a state of indescribable terror.”

The hydrophobia, or inability to swallow fluids, is shortly accompanied by an increased flow of saliva, termed the “hydrophobic slaver.” This secretion, as the disease advances, is not only copious but viscid, so that it adheres to the throat, and causes incessant spitting, often accompanied with a burning pain in the chest, and amounting, according to Troillet, to a large quantity. Menière says\* “I have  
“always seen this secretion go on, augmenting from  
“the beginning of the confirmed stage till the close of the  
“disease ; sometimes it diminishes at the last moments of  
“life, but the quantity may be taken as the measure of the  
“disease.”

The aversion to fluids is no sooner established, than another series of symptoms of dreadful severity, or a highly exalted state of every corporal sense, is added. Indeed, it is hardly possible to depict the sad sufferings of the patient from this cause, for not only does he shrink at the slightest

\* P. 547.



breath of air that blows upon him, but the passage of a fly, the motion of the bed-curtain, or any attempt to touch him, produces an indescribable agony, almost amounting to convulsions. The sense of sight is no less a source of terror than that of touch, for the approach of a candle, a reflection from a mirror, or other polished substance, occasions the same distressing effect. The hearing is also as strongly affected as the other senses, so that the least noise, and especially that of pouring out fluids, throws him into a fearful paroxysm. One of the dressers who sat up with a hydrophobic boy in St. Thomas's Hospital, making water within his hearing, threw him into a violent agitation. The degree in which this painful state of the senses exists, may be understood, when it is stated that Magendie gives the case of a deaf and dumb child, who heard distinctly during the disease. The patient, thus incessantly harassed and pained by every circumstance around him, becomes peevish and irritable, and at length sees his family, relations and strangers with feelings of dislike and aversion, and sometimes apparently with horror.

The *third stage* commences by the cerebral functions becoming more disturbed, the mind being either filled with dreadful apprehensions, or else so entirely overthrown, that paroxysms of furious insanity or fits of epilepsy follow. In this stage, horror is deeply marked on the countenance, and every symptom is aggravated. The saliva grows thick and ropy, while the poor sufferer, not daring to make the slightest attempt to swallow, spits it out incessantly, oftentimes with frequent retching or vomiting. In this state, he sometimes turns black in the face, and calling out he is suffocated, falls into convulsions, or else, exhausted by his great efforts, a sudden calm ensues, and, as if nature gave up the struggle, dies without a groan.

There are no symptoms of the disease, however, which admit of greater variation in degree than the mental affection, since in some few cases, it amounts to little more than excessive sensibility and impatience, while in others, the patient is quite maniacal. Of the cases I have witnessed, the one in

which the mind was the least affected is the following: The patient was a little girl about eight years old, and the last few hours of her life were passed as follows:—On the slightest stream of air passing over her, she would jump up in bed and entreat that the curtains might be drawn; but on the slightest attempt to draw them, she would as instantly entreat they might be undrawn. She dreaded the light, yet with strange earnestness begged not to be left in the dark. In the midst of this excessive excitement, she fell on her knees, and attempted to repeat the Lord's prayer; but a few petitions uttered, some slight circumstance again recalled her attention to the distressing sensibility of the surface, and this passed, forgetful of the prayer she had began, she enumerated her childish errors, and asked for forgiveness and a termination of her sufferings. This afflicting scene lasted for more than two hours, when, to the great relief of all around her, she suddenly sunk down exhausted, and died after a slight struggle.

More commonly, however, the insanity is of a more terrific and maniacal character. In Dr. Powell's case, the patient, a woman, lay for two hours almost in constant convulsions, but recovering, she urged frequently and earnestly her desire to be bled to death, but finding her entreaties unavailing, she became quite unmanageable, bit Mr. Wheeler in the hand, and continued for four hours in a state of furious insanity, till at length becoming more and more exhausted, she died forty-seven hours after the first marked symptom of hydrophobia.

The case recorded by Dr. Marcet is also strikingly illustrative of this last stage. The patient was a man of about twenty-eight years of age, "and after taking the second dose "of hyoscyamus, our poor patient burst into a dreadful "paroxysm of rage. He exclaimed that the medicine burnt "him to death, and threw himself on a bason of water, out "of which he drank about half a pint with indescribable "eagerness. From this moment, he conceived we intended "to poison him, and expressed the greatest reluctance



“to our approaching him. As the hope of affording relief  
“by any kind of treatment or medicine was quite vanished,  
“and as our presence could only have the effect of exasper-  
“ating the patient, we abstained from shewing ourselves to  
“him, but through the cracks in the door we anxiously  
“watched the close of this melancholy scene. During the  
“night of the sixth and last day, his spitting was almost  
“incessant. He had no sleep at all, and had been at times  
“delirious. He had sung songs, and talked of drinking  
“with his friends, yet knew all those who were about him,  
“and still spoke with kindness to his wife and children.  
“He had drunk a good deal during the night, but in the  
“morning, refused all liquids, thinking we had put poison in  
“them. Between five and six o’clock in the evening, he  
“expressed some wish to sit up to tea, but tea being brought  
“him, he shuddered at the sight of it. Once, after spitting,  
“he said he thought he saw his saliva burn. At another  
“time, he said there was blood in it. His pulse, at this  
“time, was 132 and extremely small. He now became  
“exceedingly weak and restless, and at six o’clock, he  
“raised himself in his bed much oppressed, and, striving to  
“vomit, but having failed in the attempt, he fell back on his  
“pillow and suddenly expired.\*”

The closing scene of a case given by Drs. Adam and Brown, in the Medical and Physical Transactions of Calcutta,† is equally terrific. On seeing the patient, he exclaimed, if we could not give him assistance, “he must be suffocated—  
“he would die—and prayed God Almighty to look down with  
“mercy on his sufferings. On our attempting to feel his  
“pulse, he suddenly sprang on his feet, and stamped with  
“great violence on the bed steps, when, extricating himself  
“from the bearers, and dashing aside the screen interposed  
“between the bed and the door of the apartment, he rushed  
“frantic into the outer hall. It was in vain the attendants  
“attempted to restrain him, he offered violence to no one,  
“but seemed to be endued with a superior muscular strength,

\* Medico-Chirurgical Transactions, vol. i. p. 132

† Vol. ii. p. 64.

“and hurried along by an impulse which nothing could control. The frightful cries he uttered, accompanied with an occasional remark that ‘it was a dreadful death,’ seemed to fill all present with mixed sensations of pity and horror. After running about the room, he would suddenly fall down and roll himself on the floor, and, in an instant, start up again. Paroxysm succeeded to paroxysm, till nature, unable to bear the contest any longer, at length gave way, he became convulsed, and, in the brief space of little more than twenty-four hours from the first unequivocal symptom, this unfortunate man was numbered with the victims who have perished by rabies canina.”

In a case which occurred some short time ago, at St. Thomas’s Hospital, the patient, a lad of not more than eighteen years old, was so perfectly infuriated, that he drove the nurses, the gentlemen in attendance, and every other person out of the room, throwing at them the tables and chairs and whatever else he could lay hold of. The door was now locked upon him, and, in a few hours after, he was observed suddenly to fall down exhausted and to die. Sometimes the symptoms, though not so distressing, have been observed to be even more formidable. A patient under Dr. Hue, in St. Bartholomew’s Hospital, after being bled, fell into a most violent epileptic fit, which lasted nearly twelve hours, and terminated his life.

When we remember how terrific the symptoms of hydrophobia are, we can hardly be surprised that the annals of medicine should have to record cases of voluntary death to avoid their horrors. A man and his wife named Grant, and living in the Highlands, having been bitten by a mad dog, and having a most tremendous impression of the horrors of dying in a paroxysm of hydrophobia, had their veins opened, that they might bleed to death. They bled to death accordingly, evincing throughout, the most calm resolution and hopes of mercy in another and a better state. These people had been bitten with several others, while occupied as husbandmen, and they all died. The wife was sitting near the door of the cottage, when, seeing the dog approach, she threw



the child in her arms into a basket or creel, and thus saved it.\* So late as 1814, Dr. Albers, of Bremen, was sent for by a hydrophobic patient, in order to bleed her to death, and thereby release her from her sufferings.

In general, in the last stage, the pulse is quick, and has been counted as high as 150. The patient, who usually complains of debility from the commencement, whatever force he may exert during his paroxysms, appears at each interval to become rapidly weaker. In a few cases, most of his sufferings unexpectedly subside, and he is tranquil, he can eat food, nay, drink, and the apprehension of the excruciating torture of swallowing, no longer disturbs him. From this calm, he sinks into a sound sleep, and suddenly awaking, expires. Sometimes, on attempting to change his position, he dies suddenly, or is seized with a violent convulsion. In the great majority of cases, there is no calm or intermission, but the paroxysms becoming more and more violent, at length carry off the patient. "The muscles," says Dr. Bardsley, "remain rigid long after death; the eyes, in some instances, retain their peculiar brightness, and the iris its contractibility till the following day, nay, in one case, the pupil, which had remained constantly dilated during the disease, returned to its natural dimensions after death."

Dr. Hunter speaks of priapism as an occasional symptom of this disease, and this seems slightly to have occurred in Dr. Marcet's case. A remarkable train of lascivious ideas occurred, also, in a lad only fourteen years of age, attended by Mr. Holgate at Hendon. Portal, also, states that he has seen several instances of furor uterinus occurring in hydrophobic women.

The symptoms of hydrophobia, or dread of drinking and inability to swallow fluids, it will be seen, abated for a few hours in Dr. Marcet's case, but afterwards returned. In Dr. Powell's case, also, the patient was able, for a time, to drink copiously, but quickly rejected what she drank, and the re-

\* Medical and Physical Transactions, Calcutta, p. 61.

mission of this symptom in the last stage has often been observed.

The pulse at the beginning is not quickened, nor is the skin hot, but as the disease advances, it rises to 140 or 150, and, in some instances, is accompanied by fever.

The duration of this affection is from less than twenty-four hours to six or seven days. Dr. Elliotson attended two little girls who died in less than twenty-four hours from the symptoms being first observed, while Dr. Marcet's case lived six days. The mean duration has been stated between two or three days.

*Diagnosis.*—There is no disease with which hydrophobia can be confounded, but there are many reported cases in which the imagination of a patient, bitten by a dog, has been so powerful as to simulate the disease.

*Prognosis.*—There is no instance of any patient or animal suffering from this disease having recovered.

*Treatment.*—As there is no well authenticated case of recovery recorded in medicine from hydrophobia, and hardly any instance even of mitigation of symptoms, all that remains is to mention the most leading experiments that have yet been made, with the hope that, as they have not been successful, they may not be repeated.

Hydrophobia is not unfrequently accompanied by slight inflammation of the mucous membrane of the lungs, the pharynx, or of the stomach. The brain, the chord, and, also, their membranes have been found greatly congested. These data have very properly led to the practice of bleeding in this disease, but, it is apprehended, without any beneficial effect.

Dr. Hamilton,\* gives twenty-one cases, and adds, many hundred more are on record in which venesection had been unsuccessfully practised, though copious and often reiterated. Dr. Fothergill, also, speaks of having used the lancet freely, so does Mead, who took away "large quantities of blood," but adds rather absurdly, "all has been in vain, because too

\* Appendix, vol. ii, p. 20.



“late.”\* Dr. Rutherford bled a patient to sixty-six ounces, who had been previously bled the same morning, but without success. Bousquillon has bled patients in hydrophobia à *outrance*, but they died quite as soon as those that were not bled. Menière gives the case of one hydrophobic patient whom he bled to fifteen pallettes in eight hours, and of another to three pounds,† but they both died without the mitigation of any symptom. Another case is also given by Troillet, in which the patient was bled to seven pounds, but the disease, nevertheless, continued its fatal course. Dr. Elliotson states, “I employed it in one case, and I fancy,” he adds, “I sent the patient out of the world some hours sooner than he would otherwise have gone. As the blood flowed, his pulse became weaker, and the disease much more intense, and the patient died in a very short time‡.” In the Medical Gazette for December, 1828, there is a case mentioned by Mr. Gooderich of an old man, bled to a hundred and fifty or hundred and sixty ounces, but no relief was afforded, he became worse and worse, and died in twenty-four hours from the period of the attack. Magendie and Dupuytren have employed venesection and failed. M. Breschet, also, says that the more he bled his patients, the quicker they seemed to die.

In looking to the effects of medicines in this disease, they are so entirely powerless, that we are almost led to believe that the hydrophobic poison arms the constitution against their usual actions. In proof of this position, Magendie injected ten grains of opium into the veins of a rabid dog, without producing the slightest narcotism, although a single grain of the watery extract will send a healthy dog fast asleep for eight or ten hours. Dupuytren also injected eight grains of a gummy extract of opium into the veins of a young man labouring under hydrophobia, but without any appreciable result. Magendie has also injected, not pure hydrocyanic acid, but Scheele’s prussic acid, but without influencing the progress of the disease; so that he adds, if substances of this

\* Vol. i. p. 99.      † Archives Générales, tom. 18, p. 536-542.

‡ Principles and Practice of Medicine, p. 504.

activity produce no effect, where are we to look for more powerful agents?\*

In searching for the antidote to this bane, all the most powerful remedies of every class have been tried, as mercury, iron, arsenic, the nitrate of silver, camphor, musk, opium, belladonna, cantharides, turpentine, tobacco, and, indeed, all the most potent agents that have, at any time, been introduced into the pharmacopœia. It must be admitted that all these remedial agents have failed, and to prove that they have not been employed in inefficient doses, it may be necessary to mention the extent to which some of them have been exhibited.

Dr. J. Vaughan gave, in divided doses, to a hydrophobic patient, fifty-seven grains of opium, and also half an ounce of laudanum in an enema, in fourteen hours. Dr. Babington subsequently gave one hundred and eighty grains of solid opium in half drachm doses, in the short space of eleven hours, without the least narcotic effect, the slightest amendment, or even procuring sleep. Dr. Brandreth has injected small quantities of the acetate of morphia, equal, as he supposes, to about four grains of opium, into the veins of a hydrophobic patient; but the mitigation was slight, and the disease terminated suddenly and fatally.† Dr. Bardsley, also witnessed the injection of the acetate of morphia in another case, but it altogether failed in diminishing the violence of the symptoms, and retarding the fatal progress of the malady.

Among other remedies in the treatment of hydrophobia, belladonna has enjoyed much reputation. More than fifty years have elapsed since Münch recommended this substance, and it has had a very extensive trial. Sauter assures us that he has given the enormous quantity of eighteen grains for a dose, while Nord has given a drachm within twelve hours. The last case treated at St. Bartholomew's Hospital was by this remedy; and other cases are given in the medical and physical transactions of Calcutta, but in none was it of the slightest benefit.

\* Magendie, Journal, vol. i.

† Medical and Surgical Journal.



Mercury, from its action on the salivary glands, whose functions are evidently impaired in hydrophobia, was recommended towards the close of the seventeenth century by Taury and Ravelles; and this mineral has been extensively tried, but has disappointed all the hopes that had been formed of it. The extent to which it has been given may be judged from the case cited by Dr. Satterly—the patient was a child only eight years old, yet to this infant, 3ij drams of calomel, or nearly so, were given by the mouth, while two ounces and a half of strong mercurial ointment were, in the course of a few hours, rubbed in. A case is also given by Drs. Brown and Adam, in which fifteen grains of calomel, six grains of pulvis antimonialis, with a grain and a half of opium, were given every four hours. It is unnecessary to add that both these patients died.

The preceding facts shew the scale on which the most powerful medicines in our pharmacopœia have been exhibited for the cure of hydrophobia, and their failure, in these enormous doses, in producing any of their usual effects, demonstrate that the constitution must be under the influence of an agent more potent than any known remedial substance. The theory of medicine allows us to hope that there exists in nature a remedy for every disease, and that by perseverance, should these unfortunate cases continue to present themselves, it may at length be discovered. Every new substance, therefore, which presents itself should be tried: and every variation from ordinary practice will be acquiesced in by the public, and supported by the profession.

The following are a few of the medicines which, in addition to those that have been mentioned, have been tried and failed. They are but few, for Plouquet in his *Literatura Medica Digesta*, has enumerated more than one hundred and fifty different substances.—

Arsenic was tried by Dr. Marcet	.	{ Galvanism Strychnine Nitrous Oxyde }	} by Dr. Bardsley
Acetate of Lead by Menière	.		
Cuprum Ammoniatum by Dr. Vaughan	.		
Nitrate of Silver by Dr. Powell	.	Chlorine in the Hospital at Milan.	
Carbonate of Iron by Dr. Elliotson.	.	Cantharides from the earliest times	
		Guaco by Dr. Roots.	

The failure of every remedy exhibited by the mouth, and the powerlessness of opium and of laurel water when injected into the veins, so convinced Magendie, that in hydrophobia the constitution was armed against the action of any medicinal substance, that, on a patient labouring under this disease, being brought to the Hôtel Dieu, he determined to rely for all treatment on an injection of warm water into the veins. The patient at the time of the operation is represented as being furiously insane, and his mind so overthrown, as to require to be confined in a straight waistcoat. In this state, and with a pulse of 150, Magendie injected into his veins, at nine different times, and in the course of two hours and a quarter, two pounds of water at the temperature of 100. At the conclusion of this operation, the pulse had fallen to 80, and the raving had subsided, so that the patient having recovered his senses, the straight waistcoat was no longer necessary. The sequel, however, renders it doubtful whether this mitigation was desirable, at the price of the intense suffering by which it was followed. The poor man lived eight days afterwards; but the despondency and mental agitation quickly returned, and, at the end of three days, the poison appeared to set up a new series of specific actions, for there came on excessive pains of the wrists, elbows, and knees, so that he was unable to bear the weight of the bed-clothes, and died in great torture. The articulations thus affected, were found, on posthumous examination, filled with pus, and their synovial membranes greatly inflamed. At the junction also of the ilium and cœcum, twelve small ulcers were found, while the mucous membrane of the small intestines, from the ilium to the lower end of the jejunum, was inflamed.\* The momentary relief obtained in this case, was probably owing to the mechanical pressure made on the sentient extremities of the nerves of the inner membrane lining the blood-vessels, for no sooner was the artificial plethora removed, than the system was again under the influence of the poison, and in a greater degree than before. This case is ex-

\* Magendie, Journ. tom. viii, p. 329.



tremely remarkable, as being the one in which life was prolonged for the greatest period of time recorded of this disease, and also for a new series of secondary actions, more painful and equally fatal, than those previously known. The experiment has since been repeated by Gaspard and others, but the mitigation has been so slight and transient, as to give little encouragement for repeating it, and tried on the rabid dog by Mr. Youatt and Mr. Mayo, it proved eminently unsuccessful.

The property which some animal poisons have of controlling and of counteracting the actions of other morbid poisons on the constitution, has caused this class of agents to be tried in the cure of this disease. The rapid and powerful effects of the bite of the viper, led to the hope, the poison of that reptile might prove an antidote to the hydrophobic virus ; but the experiment has been tried with an equal want of success in France, in Germany, and in Italy. Mr. Grindard\* conceived the vaccine poison might influence hydrophobia, and, accordingly, he vaccinated a hydrophobic child, first in one arm then in the forehead, and afterwards injected five charges of dried vaccine lymph into the venous system ; but the child died without any marked remission and in the usual time.

*Preventive treatment.*—Since we have, as yet, failed to discover a remedy for the cure of this most fatal disease, the enquiry into the means of preventing it is an object of the first importance. Celsus has recommended, that immediately after a wound has been inflicted by a rabid dog, that the poison should be extracted by the application of the cupping-glass, or by sucking it out, or by putting the patient into a warm bath, the wound being still open, (*quo magis ex eo quoque virus destillat*) and sweating it out, or else to prevent its absorption by actual cautery, or by excision of the bitten part. Celsus appears to have limited these operations to very short periods after the accident ; but Dr. John Hunter was of opinion that the hydrophobic poison lies long in the bitten part, until having undergone some undefined change indicated by the pain rising towards the head, it was at length

\* Trans. of Provincial and Surgical Association.

absorbed and infected the blood. Upon this hypothesis, this able physician recommended the excision of the injured part, even many weeks after the bite, as a sure means of prevention—a recommendation which has been adopted generally by the profession, both in his own and in the present times. It is desirable, however, to investigate the practical efficiency of these operations, and the times at which, according to our present knowledge of the laws of morbid poisons, they may be practised with success.

The propriety of practising excision or cauterization must depend altogether on the length of time that elapses before the poison is absorbed into the system. It has been shown by Fontana, that absorption is so rapid, that the amputation even of the leg of an animal a few seconds after it has been bitten by the viper, will not prevent the effects of its poison. Bousquet also states that after vaccination, he has not been able to prevent the virus from producing its usual effects, either by immediately washing the punctured part with acids or alkalies, or by applying the cupping-glass over it till phlyctenæ have arisen. The rapidity with which hydrocyanic acid acts is well known, so that supposing it to produce its effects by absorption, that process must be, in many instances, nearly instantaneous. Now, supposing these facts to be admitted, there seems no sufficient reason to doubt that the poison of hydrophobia must be absorbed with equal energy and rapidity, and, consequently, that the doctrine of the poison laying harmless in the part for many hours, days, or weeks, without contaminating the system, is altogether improbable, and contrary to every known law of poisons.

Some further light may, perhaps, be thrown on this difficult question, from the circumstance that the practitioners in the East Indies have, very generally, abandoned all local operations, except merely washing the wound and applying a ligament above the wounded part in the treatment of persons bitten by the venomous snakes of those countries; for it has been found that so rapid is the absorption of the poison of those animals, that the patient usually lies speechless and insensible in less than an hour, and, in the opinion of Dr. Butter, if left to himself could not survive twelve hours. It



will be plain, therefore, unless it be assumed that the times of absorption of the poison of the snake and of the rabid dog be dissimilar, that unless the operation of excision or cauterization be performed within a few minutes after the bite has been inflicted, it is impossible to save the patient from the fatal disease which threatens him.

It may be said, that many patients on whom excision or cautery has been performed have escaped hydrophobia; but it is also equally certain that many persons who have submitted to these operations within a very short period after being bitten, have, nevertheless, fallen victims of the disease. In a late instance, at St Bartholomew's Hospital, the man had all the bitten parts removed by the knife, and yet died of hydrophobia. A case is also given by Menière\*, in which actual cautery was promptly used, and to such an extent, that the inflammation which followed required a number of leeches to reduce it; yet the patient, though she lived to be pregnant and to miscarry, subsequently died of hydrophobia. Mr. Rogers gives a case† in which a patient was bitten by a rabid dog, under such circumstances that cauterization by the *argentum nitratum* was immediately employed, and repeated in the course of the two next days. The accident happened in July, and the man died in the October following of hydrophobia. A spaniel having been bitten in the ear by a dog suspected of being rabid, Dr. Bent, of Moorshedabad, placed the ear on a board, and, with a scalpel, cut out a circular piece half an inch all round the wound, and washed the part well with warm water. All this was done in less than a quarter of an hour after the bite was received, which was on the 26th of December, yet, on the 11th of January, some alteration was observed in the manner and habits of the animal, and on the 14th it died of hydrophobia.

The exemption of many persons bitten, and who have been operated on, does not require the admission of the fact that the poison has been removed, for it is equally well explained

\* Archives Générales, tom. xviii, p. 527.

† Medical and Physical Journal.

on the ground of want of predisposition, for instances are on record of two, three, four, and even twenty persons having been bitten by the same rabid animal, and almost in succession, and yet only one, perhaps, has taken the disease. It may, also, be a law that the hydrophobic poison, like that of the viper, becomes gradually weaker after every bite, until at last it becomes inert.

The bitten part has not only been excised and cauterized within short periods after the bite, but, in one instance, the limb has been amputated after the disease had declared itself. The result, as might have been anticipated was unsuccessful, for if the doctrine now held be considered as established, or that the poison of hydrophobia is almost instantly absorbed—that it lies in latent combination with the blood until it produces its specific actions on the brain and eighth pair—there is no reasonable ground to imagine that the removal of the limb originally bitten could prevent the occurrence of hydrophobia, any more than the amputation of the inoculated arm would stop the progress of the small-pox. The utmost, therefore, that can be said in favour of any local operations in this disease is, that should the patient be fortunate enough to obtain professional assistance within a few minutes after the bite, the application of the cupping-glass, the use of the knife or of the caustic, since they cannot prejudice the case, may, perhaps, be innocently resorted to; but a considerable portion of an hour having elapsed, they must, in all instances, be perfectly useless except as a means of tranquillizing the mind of the patient.

Besides the practice of excision or cauterization there are few authors, from Pliny downwards, that have treated of hydrophobia, who have not, in addition to the local treatment, recommended some prophylatic medicine to be taken internally for a greater or less length of time after the bite: and it would be almost a satire upon the human mind to narrate the ineptiæ into which it has fallen when reasoning on this subject. Pliny, for instance, recommends the liver of the veritable mad dog to be eaten raw, or a portion of his tail, after being burnt, to be taken in a draught. Galen prescribed oyster shells.



The moderns have recommended immersion in the sea before set of sun, until the patient be nearly drowned. Many regular physicians have thought it their duty immediately to salivate the patient, while the empirici have boasted of the virtues of the Ormskirk medicine, and of an endless variety of vegetable or other substances. If, however, the doctrine has been established, that poisons are not acted upon by our most powerful remedies as long as they are latent, it will be seen, that no prophylatic medicine exists in nature, and that the exhibition of any substance in this stage is worse than useless.

## PESTIS.

The plague is a simply contagious disease, generally marked by fever. The more specific actions of the poison are inflammation of the lymphatic glands and the formation of carbuncles, together with the cerebral alterations of structure usual in continued fever. The heart and liver are also found enlarged. The duration of this disease varies from a few hours to a few days.





## OF THE POISON OF THE PLAGUE.

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EVERY epidemic disease of great severity, or of unusual character, was formerly termed “the plague,” and considered as belonging to an order of supernatural events—as the infliction of an offended deity to punish the sins of a disobedient people.\* The long catalogue, consequently, of calamities which history records under this name, embraces every class of epidemic disease that has at any time fallen on man. Modern medicine, however, restricts the term plague to a disease of dreadful severity, and of a peculiar character, which appears to have its origin in Egypt and in the neighbouring countries, and is unquestionably the result of physical causes.

It is impossible to determine the period at which the plague first appeared in Egypt. Some writers consider it to have been co-eval with Moses, while others contend that it was unknown as late as the Augustan age, and, consequently, is of “secondary formation.” The remotest period to which we can distinctly trace it, is when we find it spreading into other countries, and the plague of Constantinople which broke out in 544, when Justinian was Emperor, is the first, which, from its symptoms and course, can be distinctly determined to be the plague of modern times. It was so severe, that at one period 10,000 persons are said to have died daily in that

\* The Mussulmans are still taught that the plague is of divine origin, for Mohammed declared “that the plague is caused by the demon’s hostile attack upon mankind and that those that die of it are martyrs.” According to Burckhardt, also, the opinion still very universally prevails among the Moslems, that an invisible angel of death armed with a lance touches the victims whom he destines for the plague, and that he finds them out in the most hidden recesses.



city. Procopius has distinctly traced it to Egypt, and states that it spread successively over the whole empire, making its first attacks on the coast and then spreading into the interior. The symptoms were shivering and fever, at first so slight as to alarm neither the physician nor the patient, but the same day—the next day or the day after, there appeared swellings of the parotid, axillary, or inguinal glands with carbuncles and sometimes gangrene, and from the more usually diseased state of the inguinal glands it was called “*pestis inguinaria*.” These symptoms are those of the Egyptian plague and nobody can doubt the identity of the two diseases. In the year 590 another “*pestis inguinaria*” raged at Rome, when among others, Pelagius, the then Pope, died of it. Gregory the Great succeeded him, and thus describes its devastations, “*habitatores quippe non ex parte subtrahuntur sed pariter corruunt, domus vacuæ relinquuntur, filiorum funera parentes aspiciunt et sui eos ad interitum heredes precedunt.*” This pontiff composed, and the people divided into seven choirs, in solemn procession, celebrated the septiform-am litaniam or seven-fold litany on this occasion.

Many similar pestilences have subsequently raged, both in the Eastern and Western parts of Europe, and all have been traced to Egypt as their origin, but, in 1346, one broke out which from its frightful virulence obtained the name of the “black plague.” The Jews, as its supposed authors, were accused of poisoning the rivers, and for this imaginary crime they were severely persecuted and many put to death. It ravaged Turkey in Europe, spread thence to Sicily imported by vessels from the Levant; and afterwards Genoa, Pisa and, indeed, all Italy were infected. In Venice, 20,000 persons are said to have died annually for three years. In Florence, 60,000 were destroyed in one year. From Italy it passed the Alps and desolated France and Spain, Great Britain, Germany, Hungary, Denmark, and all the northern parts of Europe, so that if we may credit Villani and other historians of the time, it must have destroyed three-fifths of the inhabitants of those parts of the world. We possess some particulars of its ravages in England, by which we may judge of the devastation

it caused elsewhere. In the small town of Yarmouth, 7052 persons died in one year, and in London between the 1st. January and 1st. of July, 57,374 persons died, so that there not being sufficient ground to bury the dead, Sir Walter De Mauny purchased thirteen acres near St. John's Street, now the Charter House for a burying-place, and more than 50,000 persons were laid there the following year. This disease began with fever, difficulty of breathing, spitting of blood—then the sick had spots and swellings in the groin and arm-pits, or behind the ears, and died in about five days at most. It continued from 1346 to 1357, being as Mr. Stow calls it, the third universal plague since the deluge.

The plague continued to rage at short intervals in various parts of Europe as late as the 17th century, so much so, that between the years 1602-65, Sir Gilbert Blane has calculated, we have histories of no less than forty-five plagues. Fourteen of them occurred in Holland, in consequence, it is supposed, of the Dutch having engaged in the Levant trade about the year 1612, and twelve in England imported, as is imagined, from Holland. The last plague which raged in either of these two countries was in 1665, or the year before the memorable fire of London. This plague, termed the “great plague,” spread with such intolerable infection, that 7165 persons are said to have died in one week, while in one year no less than 68,586 died in the City of London and its suburbs alone—an immense mortality considering the comparatively small amount of the population, although the cessation of the civil wars had added considerably to its numbers.

The plague is still annually epidemic in Egypt, and very constantly rages on the Barbary, Arabian\* and Syrian coasts, and also at Constantinople, but has rarely been seen out of

\* Burckhardt has mentioned a particular custom of the Arabs. When the plague reached its height at Zembo, 1815, the Arab inhabitants led in procession through the town a she camel, covered with all sorts of ornaments, bells, feathers, &c. When they reached the burial ground, they killed it, and threw the flesh to the vultures and dogs. They hoped that the plague dispersed through the town would haste to take refuge in the body of the camel, and that by slaughtering this victim, they would at once



the Turkish dominions since the 17th century. Nevertheless, it broke out at Copenhagen in 1712, at Marseilles in 1720 and at Moscow in 1771. In the present century it has appeared at some of the Russian ports in the Black Sea. In 1813, it broke out at Malta and at Gozzo, when the losses it occasioned were estimated at a million sterling and the number of victims at between 4000 and 5000. It has subsequently broken out at Noja in Calabria in 1816, at Corfu in 1818, and, lastly, it appeared at Gussemburg in Silesia in 1819.

*Remote cause.*—The plague, and, consequently, the poison which generates it has undoubtedly a very limited origin, for it is unknown in the continents of Asia and of America, neither does it appear to be native to Europe, for although annually endemic at Constantinople, it is supposed to be yearly imported into that city from Egypt. Clot-Bey considers the plague to originate, and to be endemic along the whole of the Eastern and Southern coasts of the Mediterranean the principal centres being Egypt, Syria and Constantinople—the intensity of the affection decreasing as we approach Greece and the Adriatic on one side, and Barbary and the Straits of Gibraltar on the other. Further observations, however, are necessary before it can be received that the whole of this extensive line of country gives origin to this poison, but all authors are agreed that Egypt does originate the plague, and most of them esteem it to be the great and primary, if not the sole seat, which generates the morbid miasmata.

The fact of Egypt originating the poison is established by the evidence of the medical officers in the French army in the occupation of that country under Bonaparte, after an experience of three years and a half, also by that of the medical officers in the British army serving under Sir Ralph Abercrombie,

get rid of the disease. The ravages of the plague, he adds, were still more deplorable at Djidda than at Zembo, as 200 persons died per day. Great numbers of the inhabitants fled to Mecca, thinking to be safe in that sacred asylum, but they carried the disease with them, and a great number of the Meccars died, although much less in proportion than at Djidda. The Arabs, nevertheless, consider the holy city to be under the particular protection of their divine prophet.

and, likewise, by that of a commission sent out by the French government, to investigate the nature of the plague. The grounds on which they came to this conclusion, is the same in all—namely, that they had observed the plague to break out simultaneously in many different districts which had little or no communication with each other. Another proof of the poison originating in Egypt is that in the years 1834-5, Mohammed Ali, conceiving the plague might be imported, ordered all vessels from suspected places entering the port of Alexandria, to perform quarantine, yet, notwithstanding these and other sanitary regulations, the plague raged with more than usual violence in that city, for out of 42,000 inhabitants 14,888 perished, or more than one-third of the whole population.

It seems determined then not only that the plague does originate in Egypt, but that the poison must be generated in that country within a very circumscribed space. Volney, for instance says, that the plague in Egypt never comes from the interior of Egypt, but always appears first on the coast at Alexandria, passes from Alexandria to Rossetta, and from Rossetta to Cairo, and, consequently, he considers the poison must be generated in the rich and fertile delta of the Nile, and this fact is confirmed by all subsequent observers. Clot-Bey is the last writer on this subject, and he seems to consider that the generation of the poison is very strictly limited to small portions of country—for he says, the plague is more rare in Upper than in Central Egypt, and in Central than in Lower Egypt. The coasts of Syria, he adds, are also more often infected than Libanus or the interior districts, and the shores of the Bosphorus than the interior of the continents of Turkey in Asia or in Europe.

When the plague, then, does originate in Egypt, it seems certain that it is generated in some very circumscribed portion of that country, and two hypotheses have been invented to account for the poison which produces it. The one is, that the poison is engendered among the lower classes of persons, by the squalid misery and disgusting filth in which they live, and produces a disease propagated solely by contagion—the



other, that the poison, however generated, exists in the atmosphere, and produces an eminently contagious disease—or according to others, a disease in which the person of the patient, as in typhus, secretes a poison which is both infectious and contagious.

Of all the causes mentioned by authors as originating the poison of the plague, the crowded state of the population in Egypt—their misery and insufficient nourishment are the most prominent. Every writer speaks of their mud-built huts of the narrow and tortuous streets of their cities and of their habitations, whether isolated, in villages or in the towns, being surrounded in every direction with heaps of dung and other immundities. In the midst of these, the Arab lives in his wretched cabin, with his wives and children, his servants and his domesticated animals all huddled together. Unheard of filth, says Clot-Bey, reigns in their “infected taudis,” while Aubert describes them to be habitations fit for animals rather than for man. In addition to this, the lower classes are said to be often reduced to live upon the leaves of the thistle or on bread made from the seeds of the cotton tree. These circumstances, it must be admitted, are fruitful sources of the severest disease. It must, however, be doubtful whether they are capable of engendering any particular distemper, for if so, centres of the plague must necessarily exist in every country of the world. Most pathologists, therefore, are inclined to consider these conditions only as accessory causes predisposing to the disease, and not as those which immediately engender the poison.

Some pathologists, who consider the poison to exist diffused in the atmosphere, and the disease to be endemic in Egypt, have attributed it to the decomposition of animal and vegetable matters, favoured by the inundation of the Nile, the mud which it deposits, and the pools which it must form on retiring ; others, again, contend that it is brought or engendered by the South winds from the desert, or the Khamsim, a wind which blows at certain seasons, so suffocatingly hot, that the camel buries his nose in the sand to avoid it. Clot-Bey has examined all these causes, and comes

to the conclusion that, taken separately or conjointly, they are inadequate to account for the origin of the plague.

The hypothesis of the decomposition of vegetable or animal matter giving origin to the poison, has been imagined from the circumstance of the number of dead bodies of many domestic animals constantly lying unburied in the streets of the towns in Egypt, while the sepulture of the human body is so carelessly performed, that it is hardly covered with earth. Clot-Bey, however, observes, that the former can hardly be a cause of the plague, for the dogs and birds of prey devour them before they have time to putrify, while those which escape their voracity, are rapidly dried up by the excessive heat of the climate. It is probable, also, he conceives, that the mode of sepulture did not greatly differ in former times from that at present in use among the Egyptians. Buffon, indeed, has shown that the practice of embalming or of mummyfying must have been confined to the Royal Family and the higher and privileged classes of society—otherwise, supposing three thousand years to have elapsed since the practice of embalming was introduced, the seven millions of people of which the population of Egypt is composed must have been embalmed, a hundred and fifty times over, and the number of mummies must have reached the enormous number of 10,570,000,000, so that the dead must have expelled the living. Mohammed directed the graves for the dead should be made as deep as a man standing upright with his hands raised above his head might measure, or something more than six feet, but the Mussulmans, it must be admitted, have shown a great indifference to this precept. “Yet,” says Clot-Bey,\* “if the mode of burial was the cause of the plague, “why was it not epidemic in 1831, when cholera carried off in “twenty days more victims than the plague had ever done in “six months?” Again, why is it not developed in the plains of Mouna, where the Mussulmans on their return from Mecca annually immolate 30,000 to 40,000 head of cattle, in commemoration of the sacrifice of Abraham?

\* P. 221.



The Nile, which the ancient Egyptians deified—paid the homage of religious adoration, and which they regarded as the great source of the fertility of their country, has been considered as the great source of the plague, the cause being the rich and fertilizing deposit consequent on the overflowing of the river, which, it is well known, takes place nearly at the same epoch in each year or about the summer solstice. The inundation commences in Upper Egypt, not suddenly, but gradually, and in proportion as the waters augment, the inhabitants oppose them with dikes so as to fill the canals and irrigate all the upper country; when this is effected, and the ground saturated, they break down the dikes and the water passes on to another district. It is generally supposed that the country, after the inundation, is an immense marsh, exhaling a putrid odour, and, consequently, a *foyer* of insalubrity. “But,” says Clot-Bey, “the mud deposited is a pure clay, which does not contain any putrescent matters, exhales no odour, and has no other effect than to fertilize the ground, and render it, either a rich meadow, or a fruitful garden.”

The deposit left by the Nile on the retiring of its waters, not being sufficient to account for the origin of the plague, it has been apprehended that the colouring matter of the river, which is either yellow or green, must contain the germ of infection. But the yellow colouring matter has been found to be nothing more than particles of clay, held in suspension; while the green colour is caused by vegetable matters torn up and carried away by the force of the torrent as it rushes over the country, phenomena observed every where after considerable rain.

The khamsim has been invoked by different authorities as one of the most powerful agents in the production of the plague, if not the cause itself. This wind blows for about two months in the year, and at intervals of eight to ten days, never lasting more than twenty-four, thirty-six, forty-eight, or sixty hours, at most. But this hypothesis is invalidated by the circumstance of the khamsim not prevailing during the winter, which is the season the plague usually breaks out, and acquires its greatest intensity. It is only on the

decline of the disease that this wind becomes frequent; “and then,” says Clot-Bey, “its excessive heat seems more capable of destroying miasmata, than of engendering them.” It is remarked, also, that the borders of the desert, the most exposed to this wind, are healthy.

Many other hypotheses have been imagined to account for the origin of the plague, as the generation of a peculiar animalculæ, whose flight from place to place and from country to country, is supposed to account for the spread of the disease. Others, again, have conjectured the poison to be a terrestrial exhalation, extricated in Egypt and in a few other countries; but such conjectures are incapable of proof, and are, consequently, less satisfactory than the preceding ones.

It is, probably, in vain further to attempt to penetrate the obscurity in which the remote causes of this disease are involved, or to assign a sufficient reason why this disease, unknown, as it is conceived, in the days of the Pharoahs and of the Ptolemies, has continued to rage for the last thirteen hundred years with unabated violence, in Egypt, and, perhaps, in the neighbouring countries. It seems certain that the geological structure of Egypt, the overflowing of its river, and the conditions of its atmosphere, have undergone no change. It must be admitted, however, that the husbandry of the Egyptians has undergone a most remarkable alteration; the cultivation of rice having succeeded to that of corn, and so, also, have their manners and habits. The squalid misery and mud-built towns of the present day, forming a strong contrast with the many magnificent and stupendous monuments which remain to attest the former luxury, opulence and splendour of the cities of ancient Egypt.

The poison of the plague, therefore, like that of the small-pox, the scarlet fever, or the measles, seems to be engendered by the action of physical causes, as yet inappreciable. But they must be permanent in Lower Egypt, for sporadic cases prevail all the year round in that district. The space in which they are extricated, however, it has been shown, must be limited to narrow bounds; for this disease is rare in Upper



Egypt, and has never been known to pass the first cataracts. The hospitals, likewise, which were formed in 1834-5, along the borders of the desert, and many regiments encamped in that position, almost entirely escaped the attacks of the plague, which raged on the banks of the Nile. It was remarked, also, that several villages suffered little loss in that epidemic, although in the immediate neighbourhood of Cairo, where the disease was terrifically fatal.

The intensity of the cause generating the poison, is not constant, but varies according to the season; for although sporadic cases of the disease occur all the year round, yet the season when the plague is endemic, never begins till December, nor later than March, and ceases in the following June. Thus in 1834-5, the deaths from the plague in Alexandria were in July, two; in August, thirty-two; in September, two; in October, none; in November, twenty-six; in December, one hundred and nine; in January, one hundred and fifty-eight; in February, eight hundred and twenty-four; in March, four thousand, three hundred and twenty-nine; in April, one thousand, eight hundred and ninety-seven; in May, three hundred and twelve; in June, forty-one; making a total of seven thousand, seven hundred and thirty-five persons deceased\* in the epidemic of that year. This table also demonstrates that the plague season, like that of all other epidemics, may be divided into a period of commencement, a period of increase, and a period of decline. The law of the mortality of these different periods is also similar to that of epidemics in general; the number of deaths in proportion to the number of cases attacked, being greatest at the commencement, and gradually decreasing till at the decline of the disease although the number attacked may be great, yet the cases are slight and the mortality trifling.

The energy or intensity of the cause, varies, also, not only according to the season, but also according to the year. Thus, at Aleppo, the plague of 1760 was slight; in the following year, more severe—while in 1762, it raged with

\* Aubert de la Peste, p. xxxii.

great violence and fatality; and, as if exhausted by the effort, it ceased in that part of Syria for several years. Even in Egypt there is the greatest difference in the energy of the cause in different years; for in the years 1834-5, when the plague was epidemic all over Egypt, it is calculated seven thousand, seven hundred and thirty-five persons\* died at Alexandria of that disease alone. While in 1836-7-8, only eight hundred and sixty persons died from the same cause in the whole of that period. It appears, then, that the plague, though annually endemic in that country, is only occasionally epidemic; and the epidemic season is calculated to return not more than once in every five or six years. Many speculations have been entertained as to the causes which give rise to the epidemic virulence and diffusion of the disease. Some have referred it to a peculiar magnetic or electric state of the earth, but without being able to establish this hypothesis by any fact. Others, again, have considered it to be caused by that inexplicable state of the air, termed "epidemic constitution." It is remarkable, however, that most of the great plagues of Europe have been preceded by a severe form of fever; but the plague of Malta had no such warning herald; and during the plague of Alexandria, 1834-5, so completely had all other diseases disappeared, that Aubert states if anybody fell seriously ill, it was of the plague.

It is generally supposed when the poison is accidentally introduced into a country, that the "epidemic constitution" is necessary to rouse it into action. It is impossible to speculate on a subject so indefinite; but it is certainly remarkable, Egypt should keep up a commercial intercourse with almost every country in Europe, and that seventy to eighty thousand pilgrims should depart every year from every quarter of the Mussulman empire to Mecca, taking with them goods and merchandise from the most infected places, and yet the disease should so seldom spread, except in certain limited districts.

When the plague, however, prevails beyond the limits of

\* These are the numbers officially returned, but the calculations of Aubert makes the larger number, which has been stated as nearer the truth.



Egypt, its laws undergo some modifications. We find, for example, that the epidemic season is later in Syria and in still higher latitudes than in Egypt. Dr. Russell states that at Aleppo, in the year 1760, the plague did not break out till the 16th of May, was not at its height till the 30th of June, and did not cease till the 10th of August; also, that in the following year, though it began in March, it did not decline till the second week in July. The same retardation of season has been observed at Smyrna; for the plague of 1837, did not cease in that city till the 15th of August, or nearly two months later than at Cairo and Alexandria. At Constantinople, also, the annual period of its breaking out is still later, or from the 1st to the 20th of July, when the north wind, which has continued to blow for nearly three months, is replaced by the hot and scorching winds from the south, and it does not cease till about the month of January.

In western Europe, the epidemic season has generally been the greatest height of summer. At Marseilles, the ship which imported the disease, arrived on the 25th of May, 1720; but the first cases were not discovered till the 20th of June, and they were rare till the 1st of July. It raged throughout August and September, declined in October and November, but cannot be said to have ceased till the middle of winter, and sporadic cases occurred even as late as the summer solstice of the following year. The plague of Malta followed the course of the summer in that latitude; or, in April, three cases; May, one hundred and ten; June, eight hundred; July, one thousand, five hundred and ninety-six; August, one thousand and forty-two; September, six hundred and forty-seven; October, two hundred and eleven; and in November, fifty-three; making a total of four thousand, four hundred and eighty-six deaths out of a population of 63,000 or 64,000 souls.\* The course of the last plague in London had also a similar reference to season; for it broke out in the beginning of May, attained its height about the 10th of September, when it is said twelve thousand persons died in one week, although

\* Rees's Cyclopaedia, article, Malta.

two thirds of the inhabitants had fled the city. It then gradually decreased, till in December, they crowded back, according to Hodges, "as thick as they fled; and such confidence was now inspired, that many went into beds, before they were even cold or cleansed from the stench of the deceased, for the nature of the disorder had changed."\* The winter, however, does not always put an end to the ravages of the plague, for, according to Dr. Russell, it spread at Aleppo when the snow lay on the ground, and it is only a few years since, that at Constantinople, the mortality exceeded two thousand a-day under the same circumstances.

It will be seen, that although the periods of the year at which the plague prevails, differs, in some degree, in different countries, still that its progress is the same in Egypt, in the Levant, and in the cities of western Europe; that is, it advances slowly and silently for three or four weeks, then gradually increases, till it attains its height, and from this point it gradually declines, till it imperceptibly disappears. The mortality follows the usual law of other epidemics, and is more eminently fatal at the commencement, something less so at its height, while on its decline, the proportion of deaths to the recoveries gradually diminishes, and, at length, becomes evanescent. The power of infection, likewise, pursues the usual law, and is but slight at the commencement, it being rare to find more than one person sick in a family, and the nurses and other attendants often escape. At its height, the infection is more certain; while on its decline, the chances of impunity gradually increase, till they greatly exceed those of infection.

The total duration of the disease, in any country to which it is not native, appears to be inconsiderable, unless kept up by fresh importation. At Aleppo, it lasted from 1760 to 1762, a period of three years. But at Malta, Marseilles, and the western parts of Europe, it has generally subsided

\* May, 43; June, 590; July, 6,137; August, 17,036; September, 31,159; October, 9,444; November, 3,449; December, 734 :—Hancock on the Pestilence, p. 73.



at the end of about a twelvemonth,\* thus readily perishing on a soil from which it does not originally spring. Dr. Russell considers this law of the cessation of the plague to be so determined, that he states that in 1762, the plague at Aleppo ceased without any exertion on the part of the police, and that this was the case in many other places in Turkey. London, Nimeguen and Dantzic furnish similar examples. "Indeed," he adds, "there is little observable difference in its mode of termination in cities where purification was practised, and where it was not."

We are little acquainted with the habits of this poison as it affects animals. Dogs are said to have died of buboes, either during, or just preceding the plague-season, and bile taken from a plague patient, and injected into the veins of a dog, during the epidemy at Marseilles, appeared to produce its death. Boccaccio says he saw two pigs die in 1348; and Aubert states he was credibly informed that many oxen had died with buboes during the plague of Alexandria; Clot-Bey, however, is sceptical on these points, and the subject, of course, remains as yet undecided.

In conclusion, it seems proved that the poison of the plague is generated by some unknown causes in Egypt, and that the disease it produces is constantly endemic and often epidemic among that people, and, perhaps, also in a few neighbouring countries of very limited extent. Also that, like all other epidemics, it has its periods of commencement, of greatest intensity, and of decline, and that these periods are generally concluded, in countries to which it is native, in a few months, and in others, within one to three years. It has been shown, also, to be popularly believed that the poison is capable of being conveyed to remote countries, so unimpaired as to produce the disease, when favoured either by certain meteorological states of the atmosphere or other

\* In 1666, two thousand persons are stated to have died of the plague within the bills of mortality. It is plain, therefore, that the plague lasted for several months after its decline in the winter, as it had done at Marseilles.

unknown conditions, and, likewise, that the poison has, probably, no affinity for any other animal than man.

*Predisposing causes.*—In every epidemic there is only a certain number of persons greatly susceptible of the action of the poison, else, if the disease be severe, every town or city attacked must be depopulated. The proportion of persons, however, liable to be attacked by the plague is great, for, in that of Alexandria, in 1834, it is calculated that out of 42,000 souls, no less than 14,888 perished. In selecting, however, its victim, this poison follows the law of most other morbid poisons, attacking the poor rather than the rich, women rather than men, patients labouring under disease, rather than healthy individuals, persons constitutionally feeble, rather than the robust, and also those addicted to intemperance or other excess, than those who follow more strictly the precepts of Mohammed.

The effects of misery and poverty have been observed by all writers greatly to predispose to this disease. “I have remarked,” says Clot-Bey, “in Egypt, that “low and humid places, ill-ventilated houses, the quarter “of the indigent, and populous cities with narrow, ob- “structed streets, pay the largest tribute to this disease. “Thus, at Cairo, Alexandria and Constantinople, it is always “in the populous quarters of the Jews and Armenians, and in “the faubourgs and impassable streets, that the plague rages “with the greatest intensity. It has, also,” he adds, “been “observed, at all times, that towns on the sea coast and on “the banks of the Nile have always suffered greatly.” This testimony is supported by that of Aubert. In the plague of Alexandria, 1834-5, “the poorer classes,” he says, “in every “instance, suffered more than the rich. In Alexandria, the “quarters of the poor were ‘horribly decimated.’ Two “villages situated on the sea shore, Ras-el-Tin and Abattoir, “were almost depopulated, but in no other place was there “such an accumulation of filth—of misery so general, or of “houses so ill-built and unwholesome.” This writer, also, states, that in this epidemic no one profession appears to have suffered more than another, except the washermen, the grave diggers, and the bearers of the dead, who fell in



extraordinary numbers. In other respects the inhabitants appear to have suffered in proportion to their poverty—thus the galley slaves suffered in so large a proportion that 305 were attacked out of 400, and after these the Maltese—the Arabs—the Barbarines or Nubians being the lowest class of the population, suffered the severest losses. The mortality in Alexandria in 1834-5 is thus given by Aubert.\*

Nations	Population	Deaths according to the bulletins	Probable number of Deaths
Arabs . . . . .	20,000	5,648	10,936
Soldiers . . . . .	3,000	235	470
Negroes and Barbarines	4,000	764	1,523
Turks . . . . .	6,000	339	678
Copts, Armenians and Jews	4,000	241	482
Greeks . . . . .	1,800	357	257
Maltese . . . . .	600	367	367
Europeans . . . . .	2,600	170	170
Total	42,000	7,841	14,888

In other countries, the same law has been found to prevail, thus Dr. Russell states,† that at Aleppo, the villages suffered in a singular degree, owing, as he imagines, to the bad construction of the huts and cottages, which are small with few or no windows, and are crowded together. In Syria, also, and Cyprus where the villages like the Kaisarias are a number of mean houses built round a large inclosed area, and inhabited by the lowest class of people, “the contagion spread with great fury.” The lower class of the inhabitants of the city, also, but who live in districts where the houses are less crowded than in the villages, suffered more than the middling classes possessing more airy habitations, but less than those living in the Kaisarias. The people of rank or high office, notwithstanding the promiscuous crowds which assembled round their palaces, suffered least of all. In the great harems, also, the disease seldom spread, or of forty females, not more than four or five were attacked.

The same conditions were also observed to predispose to the disease in the last plague of Malta. It was in low,

\* P. 24.

† P. 61.

damp, ill-ventilated situations, such as the Mandraggio in the City of Valetta, that it assumed the most virulent and destructive forms. The cellars and mezzoninos were also favourite places, so much so, that an old practitioner remarked, "it seldom walked up stairs."\* The plague of London, also, was so confined to the lower class that it was called "the poor's plague,"† and Lord Clarendon has remarked in his history; "That on returning to town after the subsidence of this disease, he seldom missed any of his acquaintance." It is said, likewise,‡ there were about 60,000 souls in Copenhagen, when the plague broke out in that city, and that 25,000 died but among them, "scarce one person of note," and the reason assigned for the poor falling in such numbers is "their filthy and close habitations, three or four families living in one room." At Moscow, also, "the plague," says De Mertens, "as almost always happens, raged among the common people only, attacking none of the nobility and richer merchants, except a very few of the most incautious." At Marseilles, likewise, the greatest ravages are described as occurring among the lower orders.

It has been stated that *disease* is a great predisposing cause of the plague, and it has been found that persons labouring under chronic inflammation of the liver—of the spleen or kidneys, or any chronic affection of the digestive organs are those most readily attacked, and most rarely survive. It is singular, however, that wounds of a certain gravity, even when the individual is placed under circumstances the most favourable to infection, give an exemption from the disease, a fact which has been long and often observed.§

The robust frame of the European has been observed to be little favourable to the reception of the plague. Sir Robert Wilson states that when the plague was spreading among the natives of Egypt, the British soldiers holding intimate communication with the diseased often escaped. Dr. Ban-

\* Hennen, p. 536.

† Hodges, p. 15.

‡ Short's History, vol. ii, p. 5.

§ Clot-Bey de la Peste, p. 8.



croft also\* adds, “the plague was propagated with some rapidity for five or six weeks amongst the Sepoys, persons who were either born, or had just come from a climate much hotter than Egypt, whilst the British troops direct from England could not have been made to take the disease.”

Intemperance has also been found to be a great predisposing cause. In a proclamation by General Menou, it is stated that all observation proves that the plague is more frequently caught in places of debauch, in wine-houses and in cabarets, than in any other way, and that out of twenty persons attacked, fifteen were known to be drunkards. Sir Thomas Maitland, also, in a despatch to Lord Bathurst, states, that “in the very few solitary instances which occurred, and very few they were, (of the soldiers who did duty in the plague districts, catching the plague,) it was uniformly observable, he was always loose in his conduct, and negligent of the necessary precautions.” Clot-Bey, also, observed in the epidemics of 1834-5, that almost all habitually addicted to wine perished.†

With respect to age and sex, it has been observed that women are attacked in larger proportions than men, and that abortion, which is common among the Mohammedan women, renders them still more liable to contract the disease. Persons in the flower of their age, are more liable to it than old persons, and old persons than children.‡

*Contagious.*—The belief in the contagious nature of the plague is so general, that it still continues to be the terror of Europe; and the ports of every nation are closed against a vessel supposed to have the plague on board. This doctrine which has remained undisturbed for many centuries, has with-

\* P. 290.

† The poorest European is said to be much better fed, and much better lodged, than either the Arab or Egyptian of the same class, whose diet is principally boiled beans, des pastèques verts, dates or rice, and whose filthy habitation is shared with all the domesticated animals of the country. The negroes at Cairo died en masse. Of 500 employed at the bazaar, only eighteen remained—of sixty slaves who kept the houses of their masters, fifty-four died.—Clot-Bey, p. 112.

‡ Clot-Bey de la Peste, p. 7.

in the last few months been questioned by the publication of two works of considerable merit; or that of Aubert, a French physician in the service of the Pacha, and was attached to the Hospital Esbekie and of Kars-el-Rin at Cairo, and subsequently to that at Ras-el-Rhin at Alexandria; and of Clot-Bey, President of the Council of Health of Egypt. Both these gentlemen have declared themselves to be *non-contagionists*, or, at least, consider this doctrine to be greatly exaggerated. They have also given as the opinion of many contemporary physicians now practising in Egypt, that although the plague is contagious when epidemic, it is not so in those years in which it is only sporadic; while others, they state, consider it to follow the same laws as scarlatina, measles or typhus, and to be both contagious and infectious; a variety of opinion which shows that this subject is ill understood even in Egypt.

It will be plain also that these gentlemen, as officers of the Pacha, must be anxious to remove the barrier by which all nations have guarded their intercourse with Egypt, and, consequently, must have entered on the investigation of this law of the disease with minds greatly biassed towards the opinion they have sought to establish. Indeed, Clot-Bey, admits that the commission “*a espéré tout d’abord, arriver à une autre fin que ses devanciers.*” The general facts on which they rely, as proving the non-contagious nature of the plague, are that M. Gaetani-Bey, Bulard, Lachesi and Clot-Bey at Cairo—Duvigneau, Scisson, Fisher and Perron at Abouzabel—Rigaud and Aubert at Alexandria have visited the patients of their respective hospitals, and others at their private houses without taking any precaution, so much so that they have received the matters vomited, the blood drawn from the vein, the pus from the buboes, and the serum from the carbuncles of plague patients on their hands. They have likewise opened more than one hundred bodies dead of the plague, and yet only one of them, Dr. Rigaud, fell in the great epidemic of 1834-5. Their more particular facts, are, that they have made many experiments on animals, on persons condemned to death, and on themselves, and yet no infection has ensued. Bulard, for example, wore the shirt of a plague-patient for



forty-eight hours with impunity, while Clot-Bey inoculated himself with blood and pus taken from a similar subject without any result. It is also stated by them, that there are few Arabs, who, for a small sum in piastres (five sous each) would not submit to be inoculated. Such is a summary of the facts by which they support the doctrine of the non-contagious nature of the plague. Many of these data it will be shown are questionable, at least, not constant, and it must be left to the judgment of the reader whether the problem of the contagious or non-contagious nature of the plague could be satisfactorily determined during an epidemic so fatal, that one-third of the whole number of the inhabitants of Alexandria died, and upwards of 30,000 of those of Cairo in the course of a few weeks—on the contrary, the evidence by which the doctrine of contagion is supported, appears quite irrefragable, and is as follows :

The opinion of the plague being contracted solely by immediate contact with a plague patient, or from fomites impregnated by the secretions of his person is so prevalent throughout the Levant, that on the breaking out of this disease all those Franks and Christians whose circumstances will admit of it “shut up.” All their measures of precaution during this period of seclusion have reference to this doctrine. They admit the air freely at their windows, but nobody is admitted by the door. Before this portal, they place a double trellis work at the distance of six feet, the one from the other—beyond the outer one is a square box with shelves for the reception of supplies furnished by their agent, and a tub full of water to wash them in—within that trellis work is a pair of tongs to lay hold of the different articles, together with a vase for burning perfumes, principally storax for fumigating such of them as would be injured by passing through water. These are the precautions at home, but sometimes business obliges them to go out, when taking a stick of about four feet long as a protection from personal contact with the passengers, they pass through the city with impunity. These are the precautions on “shutting up,” and the parties who practice it, usually escape with a very small mortality. Imprudence or the tardy adoption of the measure always causes a trifling

loss among the sequestered, but it bears no proportion to that which occurs among the Arabs and Egyptians, who think it superfluous to take any steps for their safety. To the poor, says Burckhardt, the plague becomes a real feast, every family that can afford it, kills a sheep on the death of any of its members, and the day after the men and women of the whole neighbourhood are entertained at the house. The women enter into the apartments, embrace and console all the females of the family, and expose themselves every moment to infection. It is to this custom, he adds, more than to any other cause that the rapid dissemination of the plague in Mohammedan towns must be ascribed, for when the disease breaks out in a family, it never fails to be transmitted to the whole neighbourhood.

The simply contagious nature of the plague is also believed in every country without the Mohammedan rule. This is evident from the existence of the quarantine laws now in force in most parts of Europe, and from the practice of isolating those towns in which the plague may have broken out. The facts by which these precautions are warranted are extremely striking; for every time the plague has appeared in Christian Europe, the arrival of a ship, on board which one or more persons have died of the plague, has been an invariable antecedent. The disease has, also, in every instance, invariably first broken out at the port or town at which such vessel has arrived; and, if the proper precautions have been taken, has either not spread, or only in a trifling degree, into the interior. The following modern examples of the plague appearing in the west of Europe, will exemplify this statement.

On the 25th of May, in the year 1720, Marseilles being healthy, a vessel arrived at that port from Seyda in Syria, having lost seven men, during the voyage, of the plague. It was usual to send vessels and their crews, arriving under these circumstances, or having foul bills of health, to perform quarantine at Jaru, an uninhabited island, near Marseilles; but this precaution was omitted in the present case, and so negligent were the officers on duty, that the captain



and passengers were permitted to land and to lodge in the city,\* while the crew were sent to the infirmary, and allowed to associate with the persons attached to it. It appears, also, that many contraband articles were thrown over the walls. In the midst of this free communication, one of the seamen died of the plague—then the *garde de vaisseau*—then the cabin boy and two porters, and lastly, on the 20th of June, the plague broke out in the city itself, and raged with such fury, that out of a population of ninety thousand souls, it was estimated thirty-nine thousand, one hundred and thirty-four died. It spread in Provence, and caused considerable mortality in that province, but was limited to a comparatively small district of country, immediately around the original focus of infection.

In the year 1743, Messina being healthy, a ship arrived on the 20th of March from the Levant, and three men having died during the voyage, the ship was put under quarantine, in the harbour. Two days after, the captain died of the plague, and shortly after another of the crew; when, in consequence of this, the ship ten days after her coming to anchor was taken to a distance, and burnt with all her cargo. Forty days after, the plague broke out at Messina, when thirty-eight thousand persons are said to have died of that disorder.†

In the year 1813, Malta being healthy, a vessel, called the *San-Nicolo*, arrived on the 29th of March from Alexandria. On entering the port, she hoisted the yellow flag with a black spot in the centre, the signal of the plague on board, and the master reported two men had died on the voyage; and, as he believed, of the plague. The same day, also, there arrived two other vessels equally from Alexandria, the brig *Nelly* and the Spanish polacca *El Dolce*, which had equally lost some men on the voyage.

The arrival of three vessels on the same day, suspected of having the plague on board, alarmed the city, and the *Nelly* and the *El Dolce* were sent away the next morning. As the

\* Clot-Bey says not till the 14th of June.

† *Relazione Storica della Peste, nel anno 1743.*

San-Nicolo, however, belonged to a merchant, resident at Valetta, she was allowed to remain, and was put into quarantine. The master and the survivors of the crew, though apparently in good health, were, therefore, immediately sent to the Lazaretto, situated on a small island in the middle of the harbour—their heads having been previously shaved, the whole of their persons first washed in the sea and then with vinegar, and their clothes being left behind in the ship. These persons continued in good health for two days, but on the third, the captain, while playing at ball, was suddenly seized with head-ache, giddiness, and other symptoms of the plague, of which he died in thirty-six hours. His servant, also, died about the same time and in the same manner. While this occurred at the Lazaretto, the ship had been put under quarantine within about a cable's length of several points of land and of the city of Valetta, guarded only by two boats, one at the head, and the other at the bow. Unfortunately, it was known this vessel had a valuable cargo on board, and as the crews of the boats were only paid eighteen-pence or two shillings per man a day, it is supposed they were bribed, and portions of it introduced into the city. The first death is said to have occurred on the 16th of April, which would allow for the usual period of incubation; and on the 3rd of July, the disease had spread so extensively, that the organization of a police was begun for the purpose of isolating the city, and “shutting up” its inhabitants.

It is manifest that the antecedent arrival of a vessel, having the plague on board, at each of the three ports of Marseilles, Messina and Malta, and the breaking out of the disease in all these places shortly afterwards, is so remarkable, that it can only be explained by admitting the connection of cause and effect. Moreover, the fact of the plague having originated in the preceding instances, from imported contagion, and not from any local influence, is demonstrated by the following examples of the entire exemption of large bodies of persons, who “shut up” in the very heart of the pestilence.



At the time the plague raged at Marseilles, the large nunnery "des Dames de la Visitation Sainte Marie," "shut up." This house was so situated that on one side there was an infirmary, and on the other a burying ground for those who died of the plague. Other disorders, we are told, were not unfrequent at Sainte Marie, but no one died of the plague. The "Hôpital de la Charité" of the same city, a sort of poor-house, which made up three hundred beds, and was much crowded, likewise "shut up," and escaped with complete immunity. This building, after a time, was converted into an infirmary for the plague patients, the poor being removed, except two hundred, who were left in attendance on the sick; and of these, scarcely one escaped. The fact of the exemption of the religious houses, during this visitation, is thus asserted by the Bishop of Marseilles. "Certifions  
"et attestons à tous ceux qu'il appartiendra que pendant la  
"désolation de Marseilles en 1720-1, la peste n'a point  
"pénétré dans les communautés religieuses, qui n'ont eu  
"aucune communication avec les personnes du dehors, et  
"qui ont usé des précautions nécessaires pour s'en ga-  
"rantir."

In the plague of Moscow, 1770-71, the Imperial Foundling Hospital, containing about fourteen hundred souls, "shut up," and every thing received into the house was passed through vinegar. The seclusion was complete, as to personal contact, but the inmates of the establishment were allowed to converse with their parents or friends, separated only by an inconsiderable space. Four workmen, and about as many soldiers, who had got over the fences at night-time, were the only persons out of this large number attacked, and these being immediately separated, the contagion did not spread, although more than one hundred thousand persons fell victims to this pestilence in other parts of the city. At Alexandria, in Egypt, the arsenal "shut up" in 1834, containing six thousand eight hundred and twenty-four persons, and although the city was decimated, only eleven persons of this establishment were attacked. In the years

from 1812 to 1816, "Mohammed Ali," says Burckhardt, "with his family, and his principle officers, shut themselves "up in their palaces at Cairo," a strong presumption of the utility of this precaution.

When the plague broke out in Malta, in 1813, the town of Jegla or Isola, inhabited by some seafaring people, and among them many old Levant traders "shut up." This town lies on the eastern side of Valetta, the capital of the island, and the distance between the two shores does not exceed three hundred and sixty yards; yet, although the plague was raging at Valetta, and in the adjoining towns, yet not one case occurred at Isola. The following instance is, perhaps, still more remarkable.

The lower parts of the houses in Valetta are generally occupied as shops or stores by the poorer classes. The lower part of the hospital of one of the regiments, was occupied in this manner by seven families who suffered so severely, that four of them were totally cut off, and of the remainder, little more than one-fourth survived. The heated air and foul exhalations from the rooms below had unimpeded access to the apartments above, and to which they must have ascended by their greater levity, yet all the invalid soldiers escaped.

The exemption of the convent of St. Augustin, situated in the middle of the town was equally singular. On the first alarm, the principal of the convent had maintained the utmost caution in communicating with the public. At length, however, one of the servants incautiously purchased some old clothes in the Mandraggio. The man was soon taken ill, and one of the monks having volunteered to attend him, they were both placed under strict quarantine in their respective cells, and the convent converted into a well-regulated Lazaretto. The result was, that the unfortunate servant and his attendant, the monk, both died, but the disease did not spread to any other individual within its walls.

The escape of the military quartered in the towns in which the plague raged, both in Malta and in Corfu, to enforce the "shutting up" of every family, and to prevent the inhabitants of one house from communicating with those of



another, is among the most remarkable circumstances connected with the disease, supposing it to depend upon atmospheric influence, and not upon contagion. “They were “sent,” says his Excellency Sir Thomas Maitland, in a despatch to government, “into villages of all kinds; among “them, many with streets but a few feet wide; they did the “several night duties of all kinds in these villages; they “were living in the same atmosphere with the inhabitants, “and they never caught the disease which was raging in “the village. They surrounded, within a yard or two, “camps and hospitals in which the plague was raging; and “lastly, they were subjected to those hard duties which, in “all infectious diseases, are known to give a predisposition “to inflict on soldiers the most violent type of the prevailing “disease, but they never caught the plague at all.”

The preceding facts almost demonstrate that the plague cannot be the consequence of atmospheric influence in countries in which it does not originate spontaneously. It is now necessary to show, that there is a high probability that the miasmata generated by the patient do not extend to any sensible distance around his person, and that actual contact with his person or with fomites is necessary for the propagation of this disorder.

The French army on first taking possession of Egypt lost no less than eighty medical officers by the plague; an immense proportion compared with that of the army generally and the more irreparable from the communications with Egypt being altogether intercepted. At length, the French resorted to the expedient of employing Turkish barbers to dress carbuncles, buboes and blisters, as well as to bleed the plague patients, and after the adoption of this measure, only twelve medical officers died in twice the former space of time.

The English army profiting by the example of the French, endeavoured to procure Greek doctors to perform the same offices, but although high pay was offered, none would venture to live in our pest-houses. There was an equal difficulty in procuring nurses to attend the sick, most of the women refusing to act, so that at last an order was given to draw lots who should do duty at the pest hospital. The loss of the

army generally was small, and of 7883 Europeans and native Sepoys only 165 died of the plague, or about one in forty-eight, yet of thirteen medical officers seven died of this disease or more than half. “Clot-Bey, says, also, that at Cairo, the Hospitals counted numerous victims of this scourge, that many European and Arab physicians and apothecaries died—many employées, but more especially those who were most in connection with the patients.”\*

While the medical officers suffered thus largely in Egypt from being brought into immediate contact with the sick, a very different fate awaited the medical officers serving at Malta and Corfu, who adopted an efficient mode of protection. The gentlemen who did duty in the Military Pest Hospitals of those islands provided themselves with dresses, either of oiled silk, or of a material called by the Italians, *tela cerata* from its pores being stopped by a composition principally of wax. The dress consisted of a jacket made to fit pretty closely with a hood to fall over the head, and gloves of the same material attached to the sleeves, and this, with a pair of trowsers, completed the costume. In Malta and Corfu not one of the attendants thus dressed was attacked with the disease, though constantly handling infected substances, and touching the sick—they all escaped. The Forzati, or the convicts, who carried out the sick, the dying, and the dead, from the infected houses, were equally provided with these dresses, but the profuse perspirations which followed were so exhausting, that they threw them off, and now deprived of all protection they died in great numbers.

These proofs distinctly establish that the plague is communicated by direct contact, and this conclusion will be the more irresistible, when it is mentioned that the wards of the military pest hospitals at Malta were not more than from sixteen to eighteen feet square, so that had the effluvia from the bodies of the sick acted even at almost insensible distances, it seems scarcely possible the medical officers could have escaped, especially as they sometimes slept in the wards surrounded by the sick, and with no other protection than their dresses.



The last proof of the contagious nature of the plague, is that matter taken from the bubo, will, on inoculation, produce the disease. The proposal for inoculating for the plague was made in 1755 by Vespremi in his "*Tentamen de inoculanda peste*," under the expectation that a mild disease might result, as after inoculation for the small-pox. This proposal was first carried into effect by an army surgeon in the Russian service, Matthias Deggio, who performed the operation on himself, at Bucharest in 1773, and took the plague on the fourth day, but survived. This experiment has been made by three or four other persons, and among the last was Dr. Whyte, attached to the British army in Egypt, under Sir Ralph Abercrombie. This gentleman doubted the contagious nature of the plague, and had the courage to prove the fact on his own person. On the 2nd of January, therefore, he rubbed some matter from the bubo of a woman on the inside of his thighs, and the next morning he inoculated himself in the wrist with matter from the running sore of a Sepoy, and on the 6th he was seized with fever, and other symptoms of the plague of which he died.

In the year 1818-19, Dr. Sola had the opportunity of making the experiment on a large scale at Tanger, fourteen Spanish deserters condemned to death having been given up to him for the purpose of inoculation. Seven of them are said to have taken the plague, but as the experiment was made to demonstrate the virtues of oil in the cure of the plague, of course they all recovered.\*

Such is a general view of the facts proving the contagious nature of the plague. It must be admitted, this law is doubted by Aubert and by Clot-Bey, but when we find the Pacha of Egypt and his court carefully shutting up—that quarantine establishments are formed at Alexandria and Constantinople, it is impossible not to see that these doubts are not entertained by the higher ranks of the Mahommedans. But this is not all, for the Christians in the Levant generally, are so entirely persuaded of the contagious nature of the plague, they use increased ablutionary precautions during this period—that when any one of their number is at-

\* Clot-Bey, p. 349.

tacked, they send him to the Lazaretto, and the rest of the family into a hospital of observation, and that under this system, they lost at Smyrna in 1837, only eight per cent., while the Turks, who nurse their sick, remain in the same chamber with them, and take no precautionary measures of any kind, lost in the ratio of seventeen per cent., and this result is not deduced from an experience of the disease on a small scale, but from an epidemic, when out of the population of 102,000 persons, 11,079 died, or nearly one-tenth of the whole number. It may be difficult to remove the scepticism of such minds, but the facts prove volumes against their opinion.

It has been doubted whether the dead body of the plague patient is capable of communicating the disease. In the plagues, however, of Marseilles, of Malta and of Alexandria, it is distinctly stated that the grave-diggers, and the bearers of the dead, suffered in a most unusual degree. Perhaps, the following, which occurred at Moscow in 1771, and was repeated at Corfu, in 1818, where there is also a Greek church, will show the danger incident to the doctrine of non-contagion, as well as the probable infection of the dead body. “On the 15th September in the evening, an outrageous mob “broke open the pest houses and quarantine hospitals, renewed all the religious ceremonies, which it is customary “for the Greek Christians to perform at the bed-side of the “sick,\* dug up the bodies of the dead, and buried them afresh “in the City. Agreeably also to an ancient custom, the “people began again to embrace the dead, despising all manner of precaution, which they declared to be of no avail as “the public calamity (I repeat their own words) was sent by “God to punish them for having neglected their ancient “forms of worship. They further insisted that as it was pre- “ordained, who should, and who should not die, they must “await their destiny, therefore, that all attempts to avoid the “contagion were only a trouble, and an insult to the Divi- “nity, whose wrath they should endeavour to appease by

\* Besides praying by them in the ordinary manner, it is customary in Russia to carry in great pomp to the sick, the images of their saints which every person kisses in rotation.



“acts of devotion regardless of human assistance. This vast  
“intercourse and intermixture of the healthy with the in-  
“fected, caused the contagion to spread to such a degree, that  
“at this time the daily number of deaths, amounted to 1,200  
“and upwards,\*” and this out of a population not exceeding  
150,000 souls. This scene was repeated in 1816, at Corfu,  
when the populace dug up the bodies of the dead buried ac-  
cording to the customs of their country in their clothes, and  
attended a solemn mass, performed amidst a crowded congre-  
gation, and in addition, nailed pieces of the infected clothes  
on the coffin of the tutelary saint.

A singular anecdote is mentioned, also, as having occurred  
in the plague of Malta, and which seems to prove the con-  
tagious nature of the dead body of the plague patient. It is  
difficult to trace the first cases of an epidemic disease, but  
in the plague of Malta, the first victim was supposed to be a  
man of the name of Borg, who died exclaiming, “Oh ! the  
linen—the linen !” whence it is apprehended he had smuggled  
some contraband goods from the San-Nicolo, from which he  
caught the disease. The next was his child ; then his wife  
died, who aborted at seven months ; and, lastly, the midwife  
who attended Mrs. Borg. The circumstances connected with  
the death of this latter person are extremely remarkable. A  
gentleman requiring her services in his family, called on her,  
knocked at her door, and receiving no answer, entered the room,  
and found her kneeling by the bed side, as he thought in prayer.  
He waited, and as she did not move, he at length ap-  
proached, and took hold of her, but she had died in that atti-  
tude and of the plague. Having touched the dead body, he  
was not permitted to return home, but was sent to the  
Lazaretto by the committee of health, where he also died of  
the plague. The above instances seem to prove that the  
body of a person recently dead of the plague is greatly con-  
tagious. In the plague of Moscow, however, it was con-  
ceived that intense cold had the power of destroying the

\* Account of the plague which raged at Moscow in 1771, by Charles de  
Mertens, p. 22.

contagion, for as late as the month of February, 1772, upwards of four hundred dead bodies of plague patients were found secretly buried in private houses, but not one of those employed in digging up these bodies and carrying them to the public burying ground became infected, and this is the more striking as De Mertens says, “we lost thousands of the people employed in carrying away and burying the dead. “I was informed,” he adds, “by the inspector, that most of them fell ill about the fourth or fifth day of their service.”\*

*Fomites.*—By the contagion “per fomitem,” as it is termed, the plague has been supposed to spread, not only from person to person, and from one quarter of a town to another, but also to distant and remote countries. “In the plague of Aleppo,” says Dr. Russell, “there were many instances of Armenian washerwomen infected by tainted linen, of Jewish salesmen, and also of other persons from the fraudulent reception of tainted articles.”

“In the plague of Moscow,” says De Mertens,† “the contagion was communicated solely by contact of the sick, or of infected goods. It was not propagated by the atmosphere, which in no respect appeared vitiated during the whole time. The principal victims consisted of the lower order of the Russians, and these bought up every thing that was rescued from the flames, and which was of course sold at a very low price. They refused to burn the goods which came to them by inheritance, and, moreover, carried away many things clandestinely.”

When the French army was in the occupation of Egypt, there were so many instances of a connected series of deaths from the transmission of a captured pelisse, or other article of dress, that Bonaparte adopted, as far as circumstances would admit, the sanitary laws in use in the Mediterranean, and ordered all infected articles to be burnt. This order, however, caused such great destruction of military appointments, and gave such claims for compensation, that

\* P. 34.

† Ibid.



many remonstrances were made, to which Bonaparte is said to have replied : “ Je suis venu ici pour fixer l’attention et rapporter les intérêts de l’Europe sur le centre de l’ancien monde— “ non pour entasser des richesses.” The effects of the plague patients, consequently, continued to be destroyed as before. Desgenettes, the head of the French medical staff, was a firm believer in contagion, and although, in order to restore the moral of the French army, cast down at the siege of Acre, he ventured to make a show of inoculating himself with a lancet steeped in pus from a bubo when surrounded by the patients in the hospital, and afterwards bathed, in presence of a part of the army, in the Bay of Cæsarea, yet he declared, on being questioned about this circumstance, that he considered himself in much greater danger, and for a much less useful purpose, when the quarter-master of the 75th demi-brigade challenged him to drink out of his glass a quarter of an hour before dying. “ The experiment of inoculation,” he adds, “ was “ incomplete, and does not weaken the transmission of contagion demonstrated by a thousand examples.” The experience of the British army entirely coincided with that of the French as to the contagious nature of fomites, and they adopted the same precautions.

In Malta there were many instances of the spread of the plague by fomites. The following is an account by Sir Thomas Maitland of its introduction from this cause into the Island of Gozzo, about three miles from Malta, and containing about twelve thousand inhabitants. “ A man had been sent to Carmi to perform forty days’ quarantine at the Lazaretto. On being liberated, at the end of that time, he proceeded directly to his house, which was now without the cordon, that barrier having been straightened. This person, it appears, had secreted a small box in his garden before being sent to the Lazaretto, and which had escaped the observation of the expurgators. This he now dug up and carried to a village in the Island of Gozzo, where he opened it, and gave a ‘faldetta,’ a kind of black silk cloak, worn by the women, to one of his relations, from which circumstance,” says Sir Thomas Maitland, “ I do not en-

“ertain the smallest doubt the plague was generated in the  
“Island of Gozzo.”

The belief in the contagious nature of fomites is so general in the Levant, that persons “shut up” usually encage, send away, or destroy all cats and other domestic animals, which they consider as so many living fomites. Dr. Hennen says,\* that he had the following anecdote from the inspector of police at Malta. “A Greek merchant ‘shut up’ very  
“strictly, but at last, without any human being having entered his door, he was seized with the plague and died.  
“From the nature of the roofs in Malta, the inhabitants  
“spend much of their time on them, and in many situations  
“they can converse with their nearest neighbours, and can  
“frequently see what passes on the more distant terraces. It  
“so happened this merchant’s house, which was in the Ospedal  
“was thus circumstanced, and he was seen from his neighbours’ roof to go down from his terrace on which he lay,  
“to attend to some domestic concern, when a cat was observed, during his absence, to make its way from an infected  
“district over the house-tops, and to lie down on the mattress  
“the unfortunate man had just left. After some time, he  
“returned, and the cat, frightened by the noise, made her  
“escape unobserved by him. The inference drawn as to  
“cause of his death, and it seems a very natural one, is that  
“the contagion was communicated to him by the cat.” Indeed, in the plague of Malta, every article, of whatsoever kind, was considered as a fomite if it belonged to an infected person. All articles of food, also, were immersed in water for at least half-an-hour—the wine was delivered in uncorked bottles, and pigeons, fowls and rabbits, when sold, were stripped of their feathers or skins, and every particle of hair, wool, or feathers was removed by pincers and burnt.

During the epidemy of Egypt in 1834-5, some experiments were made at the hospital at Cairo, which entirely support this doctrine. On the 15th of April, at four o’clock in the

\* P. 524.



afternoon, a man condemned to death, named Abraham Hassan, was clothed in the shirt and pair of drawers of a plague patient, still impregnated with an abundant sweat, and he was then placed in the bed of the same patient, where he remained till the next morning. This person continued in health till the 19th, when he complained of head-ache and restlessness, and he died of the plague on the 23rd, or four days after the first symptoms appeared.\* The same experiment was made, and on the same day, on another condemned criminal. This person continued in health till the 21st, when unequivocal symptoms of the plague, with a bubo in the left groin appeared, but not of such severity as in the former case so that the party ultimately recovered. It should be stated, however, that Bulard made the same experiment on his own person without any infection resulting.

If the doctrine of the contagious nature of fomites can be considered as proved, it is important to determine what length of time the pestiferous miasmata may be preserved in an active state in the substances to which they adhere. In former times, there is no absurdity which has not been believed on this subject. Trincavella relates, that at Capo d'Istria the plague broke out and carried off more than 10,000 persons, in consequence of the discovery and handling of some old ropes which had been used for burying the plague bodies; and Ingrassias relates a still more extraordinary fact, or the communication of the plague in a similar manner after the lapse of twenty-five years, and which destroyed 50,000 persons. It is even hinted, the wrappings of a mummy 2000 years old have communicated the disease.

Modern experience, however, seems to prove that the period, during which the infection is retained in clothes, furniture, and other effects exposed to the air is not long. In Egypt and in Syria, the day after St. John's day, the clothes of many thousand persons, dead of the plague, are openly bought and sold in the market-places, without any apprehension of infection. After the murderous epidemy of 1835-6, says Clot-

\* Clot-Bey de la Peste, p. 353.

Bey,\* all the wearing apparel and furniture of the dead were sold in the bazaars without any previous disinfection ; but these effects of 50,000 persons deceased of the plague, did not communicate the disease in a single instance. More than six hundred houses, likewise, of the inhabitants that had died, remained empty in Cairo at the end of the same epidemic, and were not opened till some months after its termination. A Bey was charged to take an inventory of their effects, and more than fifty other persons were employed as clerks on this service, yet none of them took the plague. The strongest fact, however, is, that the hospital de l'Esbekié at Cairo was, during the epidemic, given up entirely to the plague patients, of which more than three thousand were treated there. At the close, however, of the epidemic, and while some convalescents from the plague were still left, the hospital was appropriated to a different class of patients, and from some neglect of the servants, these slept in the same beds, under the same woollen counterpanes, and with no other change than the blankets, and yet no individual caught the plague.

It is singular, also, that the same ready disinfection of fomites should have been observed in Europe. “Immediately after the plague of London,” says Hodges, “the houses which were before full of the dead, were now again inhabited by the living, and the shops which had been most part of the year shut up, were again opened, and the people again went about their wonted affairs of trade and employ, and even what is almost beyond belief, those citizens who were before afraid of their friends and relations, would, without fear, venture into the houses and rooms, where infected persons had a little before breathed their last ; nay, such comforts did inspire this languishing people, and such confidence, that many went into beds where persons had died, even before they were cold or cleansed from the stench of the disease.” In this account, it is added, “there was no want of nests or fomes, for here is woollen, linen, silk, and perhaps even cotton

\* P. 309.



“itself, yet no farther contagion appeared; but men eagerly  
“pursued their business, and thought how to repair the past  
“mortality with more than usual success.” Kemp likewise  
states,\* “that in the ending of the last great sickness (1625)  
“that the people went promiscuously among one another,  
“and the houses were quickly filled with inhabitants and  
“fresh-comers out of the country, and yet no infection fol-  
“lowed.”

“The experience acquired, also, during the plague of Corfu,  
“sufficiently proves,” says Mr. Tully, “that susceptible  
“effects of whatever nature, and however impregnated with  
“pestilential virus, can be securely purified by subjecting  
“them to the combined or even individual action of pure air  
“and water, and the more readily when immersion is followed  
“up by exposure to the all powerful influence of certain  
“degrees of heat. This was ascertained at Corfu and Ceph-  
“lonia, but more especially at the latter island, and the  
“period necessary for the purification of contaminated goods  
“was found to be extremely limited under these processes.  
“At Cephalonia, the tents which had been employed in our  
“plague-camps, after the simple process of being washed  
“half a dozen times in salt water and dried in the sun, were  
“subsequently, and with the most perfect conviction of the  
“efficacy of the means of purification, delivered by me  
“into his Majesty’s stores, and soon after employed in the  
“encampment of the garrison. Previously to our being  
“thoroughly satisfied that this process would prove effectual,  
“many articles of this description had been destroyed from  
“a suspicion of danger. Our first trials originated in neces-  
“sity, and from the success which followed, we felt ourselves  
“authorized to pursue these trials, which terminated as  
“favourably as we could possibly wish.” The most remark-  
able fact, however, of this class is, that the ship San-Nicolo,  
which was supposed to have introduced the plague into  
Malta, after having been fumigated, and well washed be-  
tween decks, was sent back in charge of a fresh crew to

\* On the pestilence of London, 1665, p. 39.

Alexandria to be unloaded, yet none of those who navigated the vessel, nor of those who discharged the cargo were infected.

It seems proved, therefore, that the virus of the plague is either exceedingly volatile, so as to be readily diffused, or of so delicate a nature, as to be readily decomposed by slight changes of temperature, and this fact seems the more certainly determined, as no officer, searcher, or other servant, employed at any of the quarantine stations in Great Britain, has been affected with the plague since the year 1665. The voyage from Egypt to any part of the United Kingdom, except under some few very inexplicable circumstances, has in all cases, for more than one hundred and fifty years, been sufficient to disinfect the cargo.\*

*Susceptibility not exhausted.*—It is a rooted opinion among the Frank population of the Levant, that the same individual cannot contract the plague more than once, and it would appear the exceptions to this rule are rare. M. Samoilowitz met with no case of second infection in the plague of Moscow, although eighty convalescent patients were employed by him at the Pest Hospital. Dr. Russel also states, that of 4400 cases, seen by him at Aleppo, only twenty eight were re-infected, or one in 157. Aubert likewise states, that in the plague of Alexandria, 1834-5, although second attacks are mentioned, yet they all occurred within five or six days of the first, so that they were probably relapses, rather than cases of re-infection. Clot-Bey, however, states, that he and his colleagues saw many individuals perish, who had formerly survived an attack of the disease.†

\* Buckhardt gives a singular instance of the belief of the Arabs of the propagation of the plague by fomites. He states that the trunk of a palm tree lay in one of the streets of Yembo, and it had been observed that many people who had stepped over it, had been seized with the plague. It was, therefore, believed the demon had taken his favourite stand on it, to wound the passers by, and consequently the Arabs took a circuitous road to avoid their foe, although persuaded he was light of foot, and could overtake them wherever they went.

† P. 64.



*Co-exists.*—The manner in which the actions of this poison are modified by the presence of other morbid poisons co-existing in the system has been but little studied. Valli thought he observed at Constantinople, that such portions of the population as had taken the small-pox, were less often affected by the plague than others, and consequently imagining the variolous poison was prophylatic against the plague, he ventured to inoculate himself with a mixture of small-pox matter and of matter taken from a plague patient. He escaped, but the circumstance of the greater exemptions of this particular class of persons is no longer believed. When vaccination was first practised, it was hoped that disease would be a preventative of the plague, but this hope has proved fallacious, for it was found in the plague of Malta, that such inhabitants as had even recently undergone this operation were not less liable to the infection. A prophylatic pomatum was also sold at one time in the Levant and at Constantinople, compounded of vaccine and of plague matter, and by all accounts did much mischief by spreading the plague more widely. It is certain, also, that neither the syphilitic poison or any other known morbid poison, gives any exemption from the plague.

*Modes of absorption.*—If this poison exists in the air as many modern writers, from the spontaneous development of the disease in Egypt believe, there can be no doubt it must be absorbed by the mucous tissues,\* either of the lungs, or alimentary canal or both. It has been proved, also, to be contagious, and, consequently, it must equally be absorbed by the skin, even without breach of surface. There are good reasons, likewise, for supposing that once absorbed it infects the blood. For the matter of the bubo is infectious, and in the plague of Marseilles, Dr. Deidier finding the gall bladder generally distended in his posthumous examinations, injected a portion of the bile into the veins of a dog which had fed a long time with impunity on the dead that lay in the streets. The dog sickened, and is said to

\* It is said that during the plague of Marseilles, the dogs fed with impunity on the bodies of the plague patients.

have died with bubo and other symptoms of the plague. M. Couzier, also, in the same epidemy, collected some blood from a man dead of the plague, and failing to inject it into the crural vein of a dog, filled the wound with the blood and bandaged it up. On the third day, the animal was dead.

Another circumstance, also, which seems to prove the infection of the blood, is the almost universal abortion of pregnant women when attacked by the plague; many being delivered in the agonies of death, or surviving the delivery only a few hours. There is also no instance of an infant brought into the world under these circumstances living, “and sometimes,” says Dr. Russell, “they have borne evident marks of the disease, while at others, none could be discovered.” Hancock, in illustration of this subject,\* gives the following table of the comparative numbers of pregnant women that died in the year 1664, or the year before the plague, and in 1665, the year of the plague.

	In 1664	In 1665
There died, women in childbed .....	189 .....	625
Children abortive and still-born .....	458 .....	617
	<hr/>	<hr/>
Total .....	647 .....	1242

In opposition to this theory, Clot-Bey† inoculated himself and two condemned persons with blood taken from a plague patient, and only one of the three was in any degree infected; but that one had a small bubo, which rapidly subsided without suppuration. As to himself he adds, “inoculation with the blood did not create in me any fear, for contrary to the opinion of Bulard and Lachesi, I was convinced the morbid principle did not reside in this humour.” He likewise gives two or three instances in which the parties were inoculated with serum from the phlyctenæ of a carbuncle, and all of them escaped. He also states that he inoculated many dogs with blood, taken from the heart or large vessels of diseased plague patients by means of incisions in the skin. Portions of bubo, in different states, were placed in contact

\* P. 73.

† P. 354.



with the subjacent cellular tissue, while he inoculated others with the blood drawn in venesection, or with pus taken from an abscess, and “des buboes entiers.” He introduced, also, the reddish serosity from the vesicle of a carbuncle into the thigh of an ass, making a sort of pouch to lodge the fluid, so that it might sojourn a long time, and be certain of absorption; and he afterwards performed an experiment in the same manner with blood drawn from the vein of a plague patient. But the results were all negative, the animals shewed no symptoms of suffering, all their functions were unimpaired, and, after the incision, the wounds healed favourably.\*

*Period of latency.*—The period of latency is a question of great moment in treating of the laws of the plague, as being that circumstance which ought to determine the length of time for the performance of quarantine. Dr. Russell states\* the period of latency from unknown causes, varies in different subjects, but the effects of the poison, in some instances, appears to be almost instantaneous, or, “at least, “to become sensible in a few hours. I venture,” he adds, “to assert this from the having known persons who “had long shut up, take ill almost immediately, or in a day or “two after coming out of confinement.” In Egypt, Aubert gives the case of a Maltese, who arrived at Alexandria from Malta, and was taken ill of the plague on the second day. Four criminals, condemned to death, were inoculated for the plague, and they all laboured under the disease before the fifth day. Dr. Whyte, who inoculated himself, was siezed with fever and other symptoms of the plague on the sixth day. Dr. Russell also says: “In those at Aleppo who were “taken ill after their entrance into confinement, supposed to “have contracted the disease before shutting up, I met with “no instance of the disease discovering itself later than the “ninth or tenth day, but as such persons had been exposed “before their confinement, it was impossible, but by conjecture, to fix the time of infection.” Aubert says:†

\* P. 356.

† P. 195.

‡ P. 12.

“ Under the new sanitary law, when any individual has been  
“ in contact with a plague patient, he is sent into the bath,  
“ made to change his clothes, and is placed in a non-infected  
“ house under quarantine, and this is termed the ‘ spolio,’ and  
“ eight days are considered sufficient to render communi-  
“ cation with the sequestered parties harmless.” Father  
Maurizo says :\* “ after an experience of more than twenty  
“ years, I venture boldly to affirm twenty days of quarantine  
“ are sufficient, for I have observed the infection always  
“ discovered itself before the expiration of fifteen days.”  
Sir James McGrigor extends this term to seventeen days,  
while M. Bertrand† places the extreme period at thirty-five  
days, after which no case was observed at Marseilles. M.  
Seisson, professor at the School of Medicine in Cairo, states  
as the result of his observations on persons sent to a camp  
of observation four leagues from Cairo, and out of the  
sphere of the epidemic, that the mean time of incubation was  
from three to six days at most. Clot-Bey says, taking all the  
facts and observations, two to three days may be considered as  
the mean duration of incubation, and if this period has some-  
times been prolonged to eight days, the instances are rare.  
The extreme periods of latency, therefore, may be stated to be  
from a few hours to about twenty days.

*Pathology.*—The theory of this disease is that a poison is  
absorbed and infects the blood, and after a given period of la-  
tency, produces certain specific actions which are either pre-  
ceded, accompanied or followed by fever. The pathological  
consequences of these specific actions are a state of the brain  
and its membranes similar to those found in the continued  
fever of this country. Also a singularly enlarged state of the  
heart, the liver and the spleen. But the most constant action  
of the poison appears to be on the lymphatic system gene-  
rally, the cervical, inguinal, and mesenteric glands being always  
found enlarged or otherwise inflamed, and giving rise to the  
characteristic bubo. The cellular tissue appears also to be  
often the seat of the specific actions of this poison, every organ

\* Muratori, lib. i, c. 12.

† Traité de la Peste, p. 381.



and tissue of the body being covered with petechiæ, and often the seat of hæmorrhagic effusion, while the sub-cutaneous tissue is commonly the seat of carbuncle.

The extreme danger attending posthumous examinations, and the prejudice of the Mahomedans long prevented any very satisfactory data being obtained respecting the specific actions of this poison. It does not appear that any case was examined at Malta or Corfu, and only three cases are reported to have been examined by the British surgeons in Egypt. The French surgeons have given some more detailed, but still it must be admitted, a most imperfect and hurried account of the pathological phenomena of this disease. The void, however, which has so long existed on this subject has lately been filled by the labours of the physicians in the service of Mohammed Ali, for Dr. Rigaud has published the result of his examinations of sixty-eight bodies of patients deceased of the plague at Alexandria, while a commission of health, appointed at Cairo to facilitate the study of the nature and phenomena of the plague, instituted more than fifty posthumous examinations, in which “the pathological lesions were noted in such a manner as to leave no doubt as to their seat or nature.”\* The commission was composed of Clot-Bey, Gaetani-Bey, Lachesi, and subsequently of Bulard, and as the work of the first of these gentlemen is supposed to speak the sense of the commissioners generally, it, of course, must be considered as the highest authority on the subject, and the following account is extracted from it.†

“On viewing the body externally, the physiognomy was not sensibly altered. In those, however, who had sunk rapidly from the disease, the face and neck were violet-coloured, giving them the appearance of patients dead of apoplexy or of asphyxia, and this was especially remarkable in the bodies of Europeans, on account of the whiteness of their complexion. The features were not sharpened as in cholera, and the emaciation was not remarkable, except of those in whom the disease had been prolonged and

\* P. 8.

† P. 83.

“ complicated with diarrhæa. The muscles presented no  
“ unusual rigidity, and, generally, decomposition was not  
“ more rapid than after death from other diseases. In two  
“ bodies with a general emphysema, the gas which escaped  
“ burnt with a blue flame on the approach of a candle, indicat-  
“ ing the presence of carburetted and sulphuretted hydrogen.

“ In the *Nervous system*, the sinuses were generally filled with  
“ black blood, and the sub-arachnoid veins greatly injected.  
“ The arachnoid cavity was often infiltrated with serum, and  
“ occasionally with trifling effusions of black blood. The  
“ substance of the brain was generally less consistent than in  
“ health, and in some cases, in which the delirium had been  
“ great and prolonged, this was strongly marked, and in  
“ many, covered with gouttes of blood (pointillée.) The  
“ spinal cord was healthy, as were also the nerves of animal  
“ life, except such portions as were traced into the glan-  
“ dular masses, or lay in the midst of hæmorrhagic effusion,  
“ and under the same circumstances, the great sympathetic  
“ offered the same alterations. The thoracic duct was healthy.

“ The *Respiratory organs*.—The costal and pulmonary  
“ pleura rarely presented traces of inflammation, but in cases  
“ of axillary bubo with hæmorrhagic effusion, the costal pleura  
“ offered, on its corresponding surface, ecchymosed patches.  
“ On the pleura, petechiæ were likewise observed. The sub-  
“ stance of the lungs was, in general, healthy and crepi-  
“ tating; they were, however, gorged, and on pressure, a  
“ bloody, frothy mucous escaped from the loaded bronchi.  
“ The bronchial mucous membrane appeared to be sensibly  
“ inflamed, although, during life, the patient had not pre-  
“ sented any catarrhal symptoms.

“ The *Circulating organs*.—The pericardium frequently con-  
“ tained a considerable quantity of reddish serosity. The  
“ serous membrane, also, covering the heart and pericardium,  
“ frequently offered hæmorrhagic patches, resembling some-  
“ times petechiæ, sometimes undoubted ecchymosis.

“ The heart was distended by blood, and was almost  
“ always enlarged from a third to a half beyond its natural  
“ size. Its tissue was often pale and sometimes softened.  
“ In general, the venous system presented no alteration



“ except the portions implicated in the glandular enlargements.

“ The *Digestive organs*.—The epiploon was healthy, except that petechiæ were occasionally observed. The stomach more or less distended with gas, always contained a yellow, green or blackish fluid, and frequently lumbrici. The colour of the mucous membrane was sometimes healthy, more commonly there was a partial redness, resembling distinct or confluent petechiæ, similar to those observed on the skin, or else the patches were of a brighter red and of less extent. At other times the redness was limited to the folds of the membrane. Such was in general the appearance when the disease was rapid. In those cases in which life was more prolonged, the mucous membrane was either of a deep-red or slate colour, ‘ardoisé,’ and partially softened, while superficial ulcerations were often traced between the folds. In a few cases, the ulcerations were deeper, with an elevated broken edge and a black base. In some bodies, the mucous membrane was marbled, bluish and emphysematous, even when the autopsy was made within twenty hours after death. In a very few cases, the mucous membrane of the stomach was natural. In one European, a clot of blood filled the stomach, and on being detached, the ulcers were seen beneath, which had caused the hæmorrhage. The small intestines offered fewer traces of disease, but almost always petechiæ were seen and occasionally of a livid colour, but in no case were any ulcerations found. The ilio-cæcal valve was the only portion of the large intestines which was found at any time diseased, and this was frequently seen without any appreciable alteration, but more commonly its colour was livid, and sometimes ulcerations were met with which extended to appendix vermiformis.

“ The *liver* was almost always larger than natural, petechial spots were often seen on its surface, and once a sort of pustule on the edge of the right lobe, conceived by some to be a carbuncle. It was always loaded with blood, but was not sensibly altered. The gall-bladder not greatly distended offered both externally and internally, petechiæ, but its

“ membranes were not otherwise altered. In two cases there  
“ was an effusion of blood into the sub-cellular tissue. The  
“ bile was of a deep colour and viscid.

“ The *spleen*.—This organ was always twice its natural  
“ size, and even more, but was rarely the seat of petechiæ or  
“ effusion. Its parenchyma was gorged with blood, and often  
“ so softened, as to be a “bouillie,” but sometimes its tex-  
“ ture was healthy. Its colour was always deep.

“ The *pancreas* was generally hard and resisting. In three  
“ cases it was twice its natural size.

As to the *Urinary organs*, “ the kidneys were often found  
“ immersed in an hæmorrhagic effusion into the surrounding  
“ cellular tissue, and they were often of a deep violet colour with  
“ large ecchymoses at their surface. The corticle, and tubular  
“ tissues were loaded with blood, and the pelvis filled with clots.  
“ The ureters also occasionally contained blood, and some-  
“ times the enlarged glands of the lumbar region so pressed  
“ upon them as sufficiently to account for the suppression of  
“ urine, in other cases, they became involved in the disease of  
“ the glands immediately around them.

“ The *bladder* was almost always contracted; the mucous  
“ membrane, though generally healthy, occasionally presented  
“ petechiæ, and sometimes the urine was mixed with blood.

“ The *Lymphatic system*.—Dissection shews that buboes,  
“ wherever seated, have always resulted from diseased lym-  
“ phatic ganglia. Even when buboes have formed at the angle  
“ of the lower jaw, or in the neck, the lymphatic glands were  
“ still the parts affected; the salivary glands being in every  
“ case found free from disease. The vessels and veins, also,  
“ comprised in their thickness, were always more or less in a  
“ state of inflammation. When bubo has formed in the  
“ groin, the deep seated ganglia below the aponeurosis of the  
“ fascia transversalis, and before the crural vessels and nerves  
“ in the triangular space of this region have been sometimes  
“ enlarged. In other cases, the sub-cutaneous ganglia alone  
“ were affected, and of these, some were placed above the  
“ ring, others below it, and others within that limit. The cel-  
“ lular tissue around them was sometimes infiltrated with an  
“ albuminous serosity, sometimes participated in the inflam-



“ matory state of the glands and sometimes was the seat  
“ of sanguine effusion.

“ The lymphatic ganglia were found constantly enlarged.  
“ Even in those instances in which death occurred before the  
“ development of the bubo, their size was always greater  
“ than normal, and varied from an almond to a goose’s egg.  
“ The least altered, were hard and injected. In a more ad-  
“ vanced stage, some without any change of colour, and others  
“ again, as richly coloured as the lees of wine were wholly or  
“ partially softened, and proceeded to a state of ‘ putrilage,’  
“ more or less complete. Sometimes these glands became  
“ agglomerated, and formed masses, some of which weighed  
“ two pounds, and often there formed around these agglome-  
“ rations a hæmorrhagic effusion which extended far into the  
“ cellular tissue. The cervical glands often become so en-  
“ larged as to form a sort of “chapelet,” and united with  
“ those of the mediastinum and of the axilla. The axillary  
“ glands again communicated with the cervical, and with those  
“ which surrounded the bronchi. Those in the groin con-  
“ nected themselves in the same manner with those of the  
“ abdomen, and these might be traced without interruption  
“ through the crural arch into the pelvis, and along the ver-  
“ tebral column. It was especially among these latter that  
“ sanguine effusions were found throughout the whole of the  
“ sub-peritoneal tissue. The mesenteric glands were also so  
“ numerous, that the whole of the mesentery seemed covered  
“ with them, but they did not exceed in volume an almond,  
“ ‘ en coque,’ while they greatly resembled it in form. These  
were also “grey, or red or livid, but never ‘ en putrilage.’ ”

The *blood* taken from two plague patients has been ex-  
amined by M. Rochet, a French chemist, and the following  
is the result of his analysis.

		First case.	Second case.
Clot	{ Water .....	35 . 576	36 . 760
	{ Fibrine .....	0 . 624	0 . 606
	{ Colouring matter .....	3 . 800	2 . 640
Serum	{ Water .....	54 . 420	54 . 180
	{ Albumen and colouring matter ..	4 . 704	4 . 944
	{ Extractive mucous matter ....	0 . 252	0 . 252
	{ Hydro-chlorate of soda & potash	0 . 408	0 . 408
	{ Carbonate of soda & a fatty matter	0 . 216	0 . 216
	{ Hydro-sulphuric acid .....	abundant traces	abundant traces

The blood examined, was drawn from the third to the fourth day of the disease, and whilst the disease presented the gravest symptoms. “The blood,” says Clot-Bey, “is evidently diseased in the plague,”\* a fact which nobody has ever pretended to doubt, although no analysis has shewn in what this alteration consists, nor the notable differences between plague blood, and that taken from a man in health. It is stated, however,† never to be buffed—that the serum readily dissolves the colouring matter, and that the lower part of the clot is but feebly coagulated.

*Symptoms.*—The poison of the plague produces those disordered functions of the great nervous centres which constitute the phenomena of fever, sometimes so severe as to destroy the patient in a few hours, and before any secondary actions are set up. In other cases, the fever is of greater or less intensity, and is preceded, accompanied or followed by secondary actions, consisting more especially of inflammation of the lymphatic glands; the formation of carbuncles; of general petechiæ; of hæmorrhagic effusion of the skin; of peculiar states of the heart, liver and kidneys; of inflammation and ulceration of the mucous membrane of the stomach; or of other portions of the alimentary canal, and likewise of such inflammation of the brain and its membranes, as is common in all febrile disorders. The order of the occurrence of these secondary symptoms, and the comparative frequency of their accession is not determined. But buboes, carbuncles, and petechiæ are considered as the characteristic and most frequent symptoms of the plague.

The fact of the plague destroying the patient, without any external manifestation of the secondary actions of this poison is confirmed by all observers. At Aleppo, Dr. Russell states,‡ “In the most destructive forms of the plague, the vital principle seems to be suddenly, as it were, extinguished, or else “ enfeebled to a degree capable only for a short time to resist the violence of the disease, and the form of the plague “ beyond all others the most destructive, exists without its

\* P. 102.

† P. 101.

‡ Medical account of the plague, p. 19.



“ characteristic eruptions, or other external marks considered  
 “ pestilential. These perished, sometimes, within the twenty-  
 “ four hours, sometimes on the second or third day, and it was  
 “ rare to find suspicious marks of infection on the dead  
 “ bodies.”\* Clot Bey also states,† that in the severest form of  
 “ the disease, the patients died in twenty-four or forty-eight  
 “ hours, rarely at a later period, purple as in cyanosis, and with-  
 “ out agony. If, however, the disease was prolonged towards  
 “ the third day, eruptions of buboes, and more rarely of car-  
 “ buncles took place. This terrible form, he adds, is that  
 “ which reigned throughout the first month of the epidemic,  
 “ almost exclusively, and occasionally at all other periods.”

The symptoms of the plague have, until lately, been but imperfectly generalized. In Malta, it is candidly admitted, the disease was so rapid, the danger of infection so eminent, and the minds of all so unnerved, that little attention was paid to the study of the symptoms. The most zealous stated much from very cursory observation, and the character of the disease was judged of in almost every instance by the appearance of the carbuncles, the glandular swellings, and by the livid spots on the skin, viewed at a respectful distance. Even in Egypt at the present day,‡ the physicians are said to enter the Lazarettoes trembling, and standing at a distance from the patient, to put their questions, and according to the reply, the general appearance, and the state of the tongue, to order the treatment, which is carried into effect by Arabs employed for this purpose. Desgenettes thought the symptoms of the plague presented three degrees of intensity; so also has Aubert, and this division is likewise adopted by the Commission. The first degree being a slight fever without delirium or buboes. The second degree, fever, delirium and buboes. The third degree, fever, high delirium, buboes, carbuncles and petechiæ.

The manner in which the plague attacks is very various. Many instances are given of patients being most suddenly attacked by this disease, as when in conversation, while walking, eating, going to bed, or during sleep. Clot-

\* P. 96.

† P. 31.

‡ Aubert, p. 16.

Bey\* thinks, however, cases of this description to be exceedingly rare, to be often exaggerated, and only to occur at the "debut" of the epidemic. "More commonly," he says, "the disease is preceded by prodromes which last a greater or less length of time. These precursory symptoms are lassitude, loss of strength, general uneasiness, mental anxiety, to which soon succeed, shivering, head-ache, vertigo and vomiting. Then appear the different local and general phenomena, and among them, bubo, carbuncles, and petechiæ, preceded or followed by coma or delirium, too often terminating in death."

The *first variety of the plague*, after the preliminary phenomena which have been described, is marked by a slight fever, frontal head-ache, an altered countenance, nausea or vomiting, followed by buboes and carbuncles, which appear either simultaneously or consecutively. The former terminating always by resolution, suppuration or induration, while the latter, more or less numerous, are always superficial. In this variety, the patient rarely keeps his bed, perspiration is readily excited, and the termination is never fatal. This form is most commonly met with at the height, and more especially at the decline of the disease.

The *second variety of the plague*.—The patient staggers as in drunkenness, has a stupid air, an injected eye, and an embarrassed speech. This is accompanied by nausea or vomiting of bilious matters, and often by diarrhæa, while in the latter stage, the matters vomited are black. There may or may not be heat of the skin, but the pulse is frequent and concentrated, and the delirium is either tranquil or agitated. The tongue is moist, white at the centre, rose-coloured at the edges and at the tip, but often on the second or third day it becomes dry, black and chapped at the centre, while the teeth are covered with sordes. The secretion of urine, also, is affected, being high coloured, at times sanguinolent, small in quantity and towards the termination, often suppressed. From the second to the third day, buboes appear in the axillæ, groin or neck, and more rarely in the ham.

\* P. 60.



At this time, also, carbuncles and petechiæ appear, and about the fourth or fifth day, in unfavourable cases, the patient dies comatose. The patient, however, may recover and his convalescence may be either rapid or prolonged. In the former case, about the fourth or fifth day, the tongue again becomes moist, the skin open, the pulse softer, and the buboes terminate either by resolution, suppuration, or induration; the carbuncles, when they exist, limit their ravages; the petechiæ disappear, and the patient is convalescent from the sixth to the eighth day. In other cases, the black tongue and all the other symptoms continue; the buboes are slow to suppurate, and the pus is serous and fœtid, and convalescence is not established till the fourteenth to the twentieth day, and during this struggle the patient often sinks. This is the variety which predominates at the height of the epidemic, and gradually disappears as it declines.

In the *third variety*, every symptom is increased, the hebetude and dullness is accompanied by an almost entire annihilation of the intellect, and by a prostration of strength so extreme, that an upright position is impossible. The pulse, moreover, is small and frequent; the tongue moist, thick and purple; the petechiæ of a dark colour; the responses stammered out, while the anxiety, delirium, or coma, are so extreme, that the patient often dies in twenty-four or forty-eight hours, purple, and without agony.

If the disease, instead of terminating in death, is prolonged beyond the period mentioned, the pulse rises, the tongue is red and dry, the skin hot, the countenance animated, the eye injected, and towards the third day, an eruption of buboes and occasionally of carbuncles follows. The patient has now a chance of recovery, as in the second variety, but such a result is rare. In this variety, buboes, carbuncles, and petechiæ are sometimes altogether wanting, and this is that terrible form which prevails almost exclusively in the first month of the epidemic, and is occasionally met with till its entire cessation.

In Egypt it was observed by the officers of the British army, that of all the symptoms of the plague, *fever* was the most constantly, though not universally, present. It was

found, also, that the type varied in different seasons, and in different parts of Egypt in the same season. At the Pest-House at Rosetta and El Hammed, many of the cases had the accompanying fever of the intermittent quotidian type, and in 1834-5, a few cases of this description were observed at Cairo. In January and March, the fever had regular remissions, and after this period, it generally, at Aboukir, assumed the typhoid form.

One of the most remarkable circumstances connected with the fever was the complete loss of muscular power. At the beginning, the patient staggered, as in drunkenness, then station became impossible, and at length the prostration becoming extreme, every limb, when raised, fell, as though abandoned to the physical laws of gravity, and, according to Mr. Price, bubo and pyrexia are not more essential parts of the diagnosis than tremor of the limbs.

The expression of the face was that of indifference, hebetude, astonishment or stupor. The complexion was generally pale, muddy and earthy, but during the period of re-action, red. The expression of the eye has been observed by all authors to be remarkable in the plague. The British practitioners speak of it as blood-shot, and of a peculiar dull muddy appearance, interspersed with points of unusual lustre, while Clot-Bey speaks of it as "phosphorescent." The pupil is also frequently dilated.

The pulse has been observed to greatly vary, but in general, it was small and frequent, and often, when imperceptible at the wrist, has been felt beating 120 and 130 at the carotids; during the period of re-action it was frequent but full. The state of the tongue, also, was found greatly to vary, for a time it was universally white at the edges, but in other cases or forms of fever, it became brown, and dry and chapped.

Vomiting is one of the most usual phenomena of the plague and often opens the scene, although frequently preceded by nausea; it sometimes comes on suddenly, and without any previous symptom. The matters vomited are yellow, green, black and sometimes entirely sanguinolent. In some few cases, the bowels are constipated, but more commonly diarrhœa occurs after the first efforts to vomit. The stools



are always foetid, ash-coloured (*cendrées*) yellow, and bilious, and occasionally black and mixed with blood; meteorism is also very frequent. Some authors have spoken of the appetite being so little impaired that the patients have died while eating; "but," says Clot-Bey, "in the epidemy of 1834-5, nausea, or loss of appetite existed in every case." In general, the thirst is inextinguishable, and at Malta many were found drowned in the tanks and wells in their eager search for water.

The delirium of the plague seldom ran to so high a degree of phrenzy as in some other forms of fever. It sometimes came on the first night, but in general not before the second. It was highest in the febrile exacerbations, subsiding in the remissions into a rambling or confusion of intellect—frequently went off in the day-time, but returned with the fever.

Many patients became comatose from the beginning, and coma very often alternated with delirium. This was generally a dangerous symptom, and most dangerous when it came on early and did not abate in the remissions. It was seldom difficult, except in the nocturnal exacerbations, to rouse the patient from this lethargy by shaking his arm, or calling in his ear, and he usually answered rationally at first, but teased with repeated questions, he became impatient at being disturbed, denied having been asleep, and as soon as left to himself, relapsed into slumber.

Loss of speech was observed to be not uncommon by the British surgeons, and came on the first or second night, but was only reckoned portentous when conjoined with other bad symptoms. A faltering and trembling of the tongue often appeared on the third day. The speech in the late epidemic\* was ordinarily embarrassed, the answers slow and hesitating, and sometimes "mutisme," which came on more especially towards the close of the disease, continued during the convalescence, and even after recovery. "I had," says Clot-Bey, "a considerable number of these cases. A few were loquacious."

As enlargement of the heart is one of the most remarkable circumstances connected with the pathology of the plague, the local symptoms to which it gives rise are of much in-

\* Clot-Bey, p. 54.

terest. "A sense of oppression about the precordia," says Dr. Russell, "was a constant attendant on the plague. The sick showed how severely they suffered by their perpetually changing posture, and when asked where their pain lay, they either answered hastily, they could not tell, or with a fixed wild look exclaimed, '*Kulbi! kulbi!*' my heart! my heart! or else, '*eujani kulbi,*' my heart pains me, or '*naar si kulbi,*' my heart is on fire."

The liver, it has been seen is almost universally enlarged, and the British medical officers observed that the region of the liver was frequently tumefied and enlarged, and that the patient often experienced pain on pressure either in the epigastric or hypogastric region, whence it occasionally extended to the kidneys.

At Aleppo, Dr. Russell states (those cases excepted which terminated in a very few hours) buboes were a constant concomitant of the plague. They do not, however, appear to be essential to the plague, for Mr. Price states, that this symptom was wanting in the great majority of his cases. In Mr. Whyte's not above half had buboes. On the contrary, Dr. Henderson observed that every one of his cases had either inflammation or swelling of the glands. The bubo was observed to occur in the larger proportion in the course of the first day, but in the smaller number, as late as the fifth, seventh, eighth and thirteenth day, and even as late as the twenty-eighth day. In Egypt they often appear to have formed within four or six hours after the first feeling of illness and in some instances were the first symptoms. According to Clot-Bey, the second or third day was the more common period.

The glands most commonly affected were the inguinal, next the axillary, then the parotid and sub-maxillary. In one case, Mr. Adrian saw an abscess the size of a pigeon's egg formed in the inner canthus of the left eye; in another, the glands about the neck were so swelled that the patient died of suffocation. The following were the proportions in which these glands of the different parts were affected at Aleppo in 2,700 pestilential cases observed by Dr. Russell.



	Inguinal.	Axillary.	Parotids.	Spurious buboes or suppurating glands on the back, abdomen, or other parts, where they exist nearly isolated.
Men.....	835	206	58	23
Women..	641	180	57	24
Children..	365	183	116	27
	1,841	569	231	74

The form of the buboes\* is round or oblong, smooth or knobled, and most commonly without change of colour. The axillary buboes were in general smaller and more painful than the inguinal. The inguinal buboes were either external or internal. The external affected sometimes the superficial subcutaneous glands, which were little painful and readily suppurated; more commonly, however, the sub-aponcurotic glands were affected, which being compressed between the sartorius and the adductor muscles caused great pain and numbness of the limb and were slow to suppurate. These often remained indolent for fifteen or twenty days and then terminated by resolution, or remained many months in a state of induration. Others formed like venereal buboes above and below the crural arch. In other cases, the buboes formed internally within the iliac fossa and imperceptible to the sight or touch, were made manifest only by severe pain, and this kind was always a fatal symptom.

The patient commonly suffered from buboes only in one of these regions, as in the neck, but occasionally they existed in two parts, or in the axilla and in the groin. In the same individual, two buboes were often seen, sometimes three or four, and rarely more. The British medical officers remarked they seldom matured till the fever was on the decline, which rarely happened sooner than the eighth or ninth day, nor were they opened till between the fifteenth and twenty-seventh day. "In general," says the Commission, "suppuration has not been so frequent as resolution, and never were they seen to become gangrened." Aubert considers the bubo

\* Clot-Bey, p. 32.

as of good augury for the patient, and its suppuration the sign of his cure.\*

The *carbuncle* is the next great characteristic of the plague, and this rarely occurs alone, but is almost always preceded or followed by a bubo. These tumours, however, are by no means of constant occurrence, for out of 2700 cases noted by Dr. Russell—they occurred only 490 times, or 194 times in men; 150 times in women; and 146 times in children. He also observed that when carbuncle and bubo were conjoined, they frequently existed on the same side.

The carbuncle appears at irregular periods. Sometimes on the first day, and more commonly in the advanced stages, but Dr. Russell saw none after the eighteenth day. Clot-Bey says, “they more commonly appear in the middle or towards the decline of the disease.” Hardly any external part is free from them, not even the penis, and in one instance, a carbuncle formed in the throat and was fatal; but Clot-Bey† excepts the scalp, the palms of the hands and soles of the feet. They occur, however, more particularly on the limbs, and more especially on the legs. In some cases they have formed on the cheek or lips, and by the tumefaction, given to the face a hideous aspect. In others, the whole of one side of the jaw has been laid bare. At others, they have formed on the eyebrow and on the eye-lid, and partly destroyed the eye.

According to Clot-Bey, there are three different varieties, and all commence in the same manner, by a small red pimple which increases, and in the centre of which a vesicle forms, containing first, a yellow, and afterwards a blackish serum. In the most benign, the vesicle bursts, and dries up in three or four days from its first formation, the epidermis alone having been affected. The second variety involves the whole thickness of the skin, as well as portions of the cellular tissue, which is moderately tumefied, and surrounded by a dark red areola. The gangrene in this form is circumscribed, and there results an eschar of from one to two inches in diameter, which is detached by suppuration, leaving an ulcer with a sharp perpendicular

\* P. 251.

† P. 34.



edge, as if made by a punch. In the severer form, the redness and tumefactions cover a large space, and the gangrene rapidly involves the skin, the cellular tissue, the muscles and sometimes even the bones. It has been remarked that the malignity of the carbuncle is in the direct ratio of the severity of the disease, but they are not of unfavourable augury, and many recover even from the second and third kind.

Their number is very various, sometimes only one—in other cases, ten or twelve. Aubert gives a case in which no less than eleven formed in the same person, and Clot-Bey an instance in which more than thirty were disseminated over the thigh and right leg, but they were all benign. When there are several, they often form in quick succession. These tumours are often very painful, and sometimes of considerable size. Aubert gives one case in which the carbuncle attained the immense size of four inches in diameter, it was seated on the back of an Arab soldier.

Petechiæ have been observed in some seasons and not in others. They present three different shades of colour according to the intensity of the disease, or rose-colour, violet and black. Their size varies from one to two lines in diameter, and they may be discreet or confluent. In the plague of Alexandria, Aubert considered them an almost certain sign of death—and after death, he found them not only on all external parts, but also on the mucous membranes of the bladder, and of the lungs, and on the serous membranes of the pericardium, the pleura and peritoneum. They were observed at all periods of the epidemy, but most frequently at its commencement, and often they did not appear till after death.

Ecchymosis or extensive effusion of blood into the cellular tissue often took place immediately preceding death, and almost before life had ceased, the capillaries allowed the blood to escape. Dr. Short found hæmorrhage a frequent symptom of the plague that raged at Bagdad in 1800-1, and in one case, a copious hæmorrhage from the eyes took place, which continued for twelve hours. As soon as it ceased, an eruption appeared over the body resembling measles, and the patient,

a boy about twelve years of age, died on the fifth day of the disease.

The duration of this disease is very various, and, perhaps, varies according to the period of the epidemic, being shortest at its commencement, and becoming gradually prolonged, as the disease becomes milder, towards the close. In several instances, the effect of the poison has been the immediate extinction of life, in others, the patient has survived only a few hours. The muccadum of the Dooley bearers of the 88th regiment, exhibited about nine in the morning symptoms of fever, about twelve o'clock a bubo appeared, and he died before four o'clock. Clot-Bey says, "nothing is so various as the duration of the plague."\* The interval which may elapse from the first symptoms of disease till the period of reaction varies from a few hours to four, six, eight or ten days, and even more. The period of reaction may vary from one day to seven days, and then the patient may fall into a typhoid state, and this stage is equally uncertain. As a general expression, he adds, the disease may last from a few hours, to fifteen, twenty, twenty-five or thirty days, and even longer.

In the plague of Malta, the horrors of mind experienced by the patients were generally most distressing, and their dread of the disorder is stated to have been greater than that of death, and that the expression of this feeling was often impressed on their countenance. Clot-Bey, however, says the Mussulmans are little susceptible of the fear of death, and always seem indifferent about their fate. When the disease appears, the disciples of Mahomet recognise the hand of God, and are silent. The Almighty has numbered their days, while, their religious faith, which is great, promises them the delights of a future life. Clot-Bey, however, adds, he has seen many Europeans preserve the same tranquillity of mind during the whole of their illness.

*Diagnosis.*—The diseases which are said to resemble the plague are typhus, severe forms of paludal fever, apoplexy,

\* P. 61.



dysentery, parotiditis, scrofulous or syphilitic affections of the gangliary system.\*

*Prognosis*—Desgenettes calculated that of the French soldiers attacked with the plague, not more than one-third recovered. At Malta, dividing the months of July, August and September, into two equal parts, it was supposed 90 in 100 cases died in the first half, and 60 in 100 cases in the latter half. At Alexandria in 1834-5, out of a population of 42,000 persons—14,000 are supposed to have died. At Cairo, one-half of the inhabitants suffered from the plague, and of these, two-thirds recovered; or, taking the entirety of Egypt, Clot-Bey† estimates the whole mortality at 50,000, or one-third of the number attacked. In the plague of Marseilles 40,000 are said to have died out of a population of 90,000.

“In forming a prognosis,” says Clot-Bey, “the period of the epidemy must be taken into consideration. If it be divided into three parts—in the first, the prognosis is always fatal—in the second, doubtful—and in the last, favourable. Under any circumstances, however, the prognosis is difficult and must be guarded.” The British medical officers observed in Egypt several instances of patients who had recovered from the fever, and whose buboes were doing well, suddenly dropping down and expiring. One of the Arab servants, who had been convalescent eight days, suddenly died while smoking his pipe. Another patient was so far recovered as to be able to walk a quarter of a mile daily, when he suddenly complained of giddiness, and expired in a few minutes. “When the stupor has passed,” says another authority, “and the patient is able to sit up, and is even disposed to pleasantry and to be jocose, the most grave symp-

\* Clot-Bey, p. 66.

† D’après le bulletin de chaque jour donné par le gouvernement, la mortalité a été de 33,000, mais l’impossibilité de constater tous les décès nous porte à penser qu’on devrait monter ce chiffre un peu plus haut, et d’après cette donnée et nos propres recherches nous sommes enduit à croire que le nombre de personnes attaquées a dû s’élever à 120,000 environ.—Clot-Bey de la Peste, p. 112.

“toms have suddenly appeared, so that I have considered  
“this state as the sign of approaching death.” It is certain,  
therefore, in this insidious disease, the most favourable symp-  
toms are often succeeded by the gravest, and the gravest  
symptoms often as suddenly give place to the most favourable.

“In general,” says Clot-Bey, “cyanosis and partial cold-  
“ness of the extremities, petechiæ, subsidence of the buboes,  
“were grave symptoms. Buboes in the neck or axilla, were  
“more often fatal than when in the groin, and when in the  
“groin, if seated behind the crural arch, or in the iliac fossa,  
“they were the signs of certain death. Carbuncles of the  
“head and neck, were indications of a severer disease than  
“when situated on other parts. A short and difficult respi-  
“ration, dilatation of the nostrils, their hair being covered  
“with a grey purulent matter were also symptoms of death.  
“The suppression also of the urine, or the occurrence of  
“hæmaturia, were likewise fatal symptoms, while delirium,  
“vomiting and diarrhæa were unfavourable complications.”

Women, in whatever stage of pregnancy, when infected  
with the plague, seldom escape abortion, and many of them  
perish even when the loss of blood has not been considerable.  
Women near their time perish almost without exception,  
surviving delivery only a few hours, and some are delivered  
in the agony of death. Dr. Russell knew of no instance of  
a child brought into the world in the mother's last moments,  
nor under any of the above conditions, surviving the birth  
more than a few hours.

The favourable symptoms are a quick re-action, abundant  
sweats, and the suppuration of the buboes. The appearance  
of carbuncles, even when in considerable numbers, give even  
more confidence of a favourable result. When gangrene,  
however, comes on, the vast ulcers that are formed aggra-  
vates the position of the patient, already enfeebled by the  
effects of a severe disease.\*

*Treatment.*—In the treatment of the plague, neither the  
practice of the French or English officers serving in Egypt



has led to any happy result. The French first tried rubbing the body with oil, in the manner so strongly recommended by Prosper Alpinus, but these frictions, instead of being serviceable, only added to the previous anxiety and oppression under which the patient laboured. Cold affusion was also tried, but it caused hæmorrhage, mercury produced diarrhæa, to scarification succeeded gangrene, and to actual cautery, increased debility. Bleeding was, likewise, altogether unsuccessful, so that the French medical officers, baffled in every attempt at heroic treatment, at length confined themselves to watching the disease and palliating symptoms, giving antimony on the accession of the fever, and opium in diarrhæa, while they supported the patient afterwards by camphor, æther, bark and wine.

In the British army a variety of similar, or other modes of treatment were tried, but with an equal want of success. Dr. Whyte relied on the lancet, but every one of his patients are stated to have died. Some gentlemen attached to the Brunonian system, put the stimulating plan to the test, and Messrs. Adrian and Whyte kept many patients under the influence of wine and opium, but this practice was so little successful that they abandoned it. Mercury and nitric acid were thought more favourably of, but mercury was only useful when it affected the mouth, and it was a general remark that the gums were unusually insensible to the action of this mineral in the plague.

It is to be regretted that recent experience has not, in any degree, advanced the successful treatment of the plague. "In the beginning of the epidemy," says Clot-Bey,\* "when the morbid cause acts with a rapidity so great, that some hours are sufficient to compromise the life of the patient, every treatment, even the most energetic, is powerless to arrest the course of the disease. When, however, the intensity of the disease abates, we may hope for the recovery of the patient." Many will attribute this happy issue to nature, but it can hardly be denied that nature may now

\* P. 128.

be greatly assisted by art. But what are the means to be adopted? This question is most embarrassing, for consult twenty different practitioners, and each will recommend a different method. One relies, for instance, on stimulants; another on narcotics; a third, is the exclusive partisan of bleeding; while a fourth cures all his patients by purging or vomiting, or by both.

In the beginning of the epidemic, and when the disease assumed the third form, and was of the greatest intensity, the indications were to restore heat to the surface, by sudorific infusions, and to excite the nervous system by æther; but under this treatment, the fatal course of the disease was in no degree arrested, and the greater part of the patients perished without re-action being established.

In rare cases, the *efforts of nature* surmounted this period, when the pulse rose, and the heat returned to the surface, and now to remove the visceral congestions denoted by the symptoms and verified by autopsy, recourse was had to general bleeding.

When there was head-ache or delirium, leeches or cupping from the neck or behind the ears was employed, also refrigerants to the head, and pediluvia, and sinapisms, and blisters to the lower extremities.

When the tongue was red and dry, gum-water, lemonade, and other mucilaginous drinks were administered, and leeches and scarifications were applied to the epigastrium. Although, it is added, these means were often followed by amendment, yet half of the patients thus treated died between the commencement of the epidemic and the end of March.

In other cases, when the state of the tongue offered no counter indication, emetics were employed to determine a perturbing and a diaphoretic effect, but this treatment had no marked influence on the issue of the disease.

With the intention of causing perspiration and abating the vomiting, the thebaic tincture was administered to a considerable number of cases, and in almost all, sweating was produced and vomiting checked, but the final result was uninfluenced.



Considering the elective action of mercury on the lymphatic system, it was thought that it might be a specific remedy in the plague, and calomel was given inwardly, and mercurial ointment was rubbed in. The calomel, however, was almost always rejected by vomiting, while the action of the mercurial ointment was trifling, so that this remedy proved of no greater service than the preceding.

At the commencement of the disease, and when shivering occurred, quina was tried, but this only aggravated the symptoms.

General bleeding was often employed, either before or after the preceding modes of treatment, and it appeared sometimes useful, often powerless, and in no instance injurious.

Towards the beginning of April, the intensity of the disease abated, and the second variety of the plague more commonly prevailed. In this variety, the disease became much more inflammatory, the buboes readily suppurated, petechial eruption was rare, the carbuncles were more numerous and less malignant, and now general bleeding with lemonade, were the means most frequently employed.

In the middle of April, the number of cases at Cairo increased from 460 to 550 a day, and the disease was at its greatest height as to the numbers attacked; but at this period, the intensity of the disease abated, and towards the first week in May, the numbers also decreased; at this point almost all the patients recovered "*livrés aux seules forces de la nature.*" Some fatal cases, however, occurred at every period of the epidemic.

"In conclusion," add the Commission, "we believe that "every therapeutic means has been absolutely useless in the "cure of the plague, and that antiphlogistic and more especially bleeding, is the only mode of treatment from which "any advantage has been derived."

As much stress, however, is laid on the value of bleeding in this disease, it becomes necessary to add the results obtained by other practitioners. Thus M. Duvigneau of the hospital at Abouzabel, says, "In the third degree all our

“ means were ineffectual. Believing at first there was  
“ inflammation of the brain, general bleeding, more or  
“ less abundant was employed, but they did not di-  
“ minish the frequency of the pulse, the stupor, deli-  
“ rium, or the restlessness. After their employment, the  
“ course of the disease was neither accelerated or retarded;  
“ and leeches, when applied late in the disease to the buboes,  
“ were in some cases followed by abundant and incoercible  
“ hæmorrhage.”\* Dr. Rigaud, also, at Alexandria says,  
that after taking four, five, or six pounds of blood in about  
forty hours, he found the same engorgements of the different  
viscera as when no bleeding had been had recourse to.  
Aubert tried bleeding, perhaps, as extensively as Dr. Rigaud,  
but at last he had recourse to the El Hachish, an annual  
plant growing in Lower Egypt, and having a great analogy  
with flax, and indeed belongs to the same genus. Bulard  
could never trace any beneficial effects from bleeding, on the  
contrary, re-action was impeded and the issue fatal.

After such evidence, it must be questionable whether  
bleeding has in any degree solved the problem of the cure  
of the plague, for the utmost that can be said of it is, that it  
is successful in slight cases, and at the termination of the  
plague, when the greater number of those attacked recover,  
whatever be the mode of treatment adopted. Indeed, the  
Mussulmans have little confidence in medicine, and look for  
their recovery at the hand of God. At Alexandria, towards  
the close of the disease, of 109 Arabs, seventy-six recovered,  
and of these, twenty-eight took no medicine but were merely  
submitted to a simple regimen. At Cairo, it is probable the  
larger portion of the population received no medical atten-  
dance whatever.

The *Treatment of the bubo*.—As every observation proved  
that when the buboes subsided or disappeared altogether,  
that the prognosis was unfavourable, every attempt was made  
in grave cases to bring them to a state of suppuration, and

\* P. 118.



actual cautery, the skin being yet unbroken, was performed. At other times, the tumour was incised as deep as the ganglia, and actual cautery was immediately applied to the parts thus exposed. In severe cases, this mode of treatment was of no avail, but in cases of less gravity, suppuration sometimes followed, and the patient appeared to be benefited. Sometimes a blister or a blistering ointment was used instead of the actual cautery and with similar effects.

In the second form, and where the reaction was greater, cauterization produced immediate active and complete suppuration, yet, nevertheless, the course of the disease was not altered; and if the symptoms were graver, the disease terminated rapidly and fatally. This conviction determined the Commission to abandon this mode of treatment, and to apply emollient poultices, which had the effect of immediately mitigating pain.

When fluctuation was felt, the tumour was immediately opened; or, when the bubo was deep-seated and below the aponeurosis, the incision was postponed till suppuration, according to every probability, must have taken place, and then the division of the integuments was large and deep. In some cases, the glands were excised, which rendered cicatrization the more prompt.

*The Treatment of the carbuncle.*—When the carbuncle was benign, emollient poultices were applied. If the slough was deep, the carbuncle was cauterized down to the living flesh. When the mortification was of great extent, a circular incision was made in the integuments immediately around the carbuncle, and an iron, heated to a white heat, was introduced into the furrow. The subsequent dressing was lint, steeped in the chlorides, and when the part granulated up, it was then dressed with a compress, “linge fenêtré enduit du cerat.”

*Dietetic treatment.*—The diet to be observed in the cure of the plague, is very imperfectly laid down by the different writers who have treated on this subject; but there can be no doubt it must be similar to that observed in other febrile disorders—or, that the patient should be limited

to slops and a strictly vegetable diet in the first stages, and should be liberally supported by wine and animal food, as soon as the buboes have suppurated, or the carbuncles have formed.

*Preventative treatment.*—The preventative treatment may be divided into the measures which are necessary to prevent the introduction of the plague into a healthy city, and into those which should be adopted, supposing that disease to have already broken out in any town, city, or camp.

As early as the middle of the fifteenth century, the Italians became convinced of the contagious nature of the plague, and established the law, that all persons coming from the East, or having communicated with ships from the Levant, should pass forty days at anchor at an appointed spot. The establishment of Lazarettos, especially that of Venice, in 1484, followed; and in 1527, the quarantine laws were still further improved, by requiring the European consuls, resident in the usually infected parts of the Mediterranean, to give letters of health to the captain of the vessel, certifying whether the plague did or did not prevail at the time of his sailing in the port from which he took his departure. The quarantine laws are still in force, and affect both persons and goods.

In this country, on the arrival of a ship at Sandgate Creek, from a port with a foul bill of health the pilot has the option of removing into the hospital ship before the hatches are opened, or to remain on board. If he removes, he has to perform fifteen days quarantine, and is then released. Should he choose, however, to remain on board his own ship, he, with the crew and passengers, are subjected to thirty days quarantine, when they are all released.

The method adopted with respect to the cargo on board a vessel having a foul bill of health at all our quarantine stations, differs according to the nature of the goods, which are divided into two classes, according to their supposed infectious nature, and is as follows:—First, two guardians are put on board, and they cause as many goods as the decks will hold to be hoisted up and opened. They are



now exposed to the air for six days, and on the seventh day they are conveyed to the Lazaretto ; after which, another portion is exposed in the same way, so that the whole cargo is deposited in the Lazaretto at the end of fifteen days. The cargo thus overhauled, supposing it to consist of goods of the first class, as cottons, skins, or old rags, is detained at the Lazaretto for forty days, when the goods and vessel are released. Should, however, the cargo consist of fruit, or other less infectious substances, included in the second class, the goods and vessel are released at the end of thirty days. The Lords of the Council have the power of shortening these periods of quarantine, and are said, occasionally, to exert it.

It is a matter of much moment, from the growing intercourse between this country and Egypt, and from the increasing value of the Egyptian cottons, to determine whether this period of fifty-five days, after the arrival of a ship, will or will not admit of some relaxation without endangering the public safety. The true period of quarantine, theoretically speaking, should be the time taken to overhaul the cargo, added to the longest known period which the poison has been determined to lay latent in the system before the appearance of the disease. The length of quarantine, therefore, ought to be fifteen days, or the time the ship has taken to be unloaded, together with seventeen days, the longest period of known latency of the poison, giving thirty-two days as the period necessary to give perfect security against the introduction of the plague into this country, making a diminution of twenty-three days in the present time of quarantine.

The period of quarantine acted upon in England, has long been considered as excessive in Holland. The plague has not appeared in that latter country since it appeared in this, yet the quarantine is much shorter among the Dutch than with us. In Holland, for instance, on a ship arriving with a foul bill of health, a part of the cargo is put into a lighter without any portion of it being suffered to be landed. The ship and cargo are now detained twenty-one days in all, and are then released ; and this regulation, since the year 1800, it is understood, has been rather relaxed than otherwise.

The person is far more dangerous than goods; for, supposing an individual to fall ill of the plague, he would immediately become a focus of most virulent contagion. Still, supposing him to be in health, after the longest known period of latency has passed, there can be no question that he may be permitted to go at large, with the most perfect safety to the community. A period of twenty-one days, therefore, is almost an excess of quarantine for the person.

When the plague has broken out in any city, experience has shown that no half measures are of any avail—that there is no middle course between allowing the disease to take its own course, and adopting the complete system of isolation followed in Malta in 1813. The mode in which this was effected, was as follows:—on proclamation of the plague existing, the gates of the town were shut, public business of every kind was suspended, the whole population was required to repair to their respective houses, and no person was allowed to move out, except especially employed by the government. After this, the town was divided into small districts (at Valetta, there were twenty-four), and a corps of volunteer guards was organised by the inspector-general of police out of the inhabitants. The duty of this corps was not to move out of their own streets, but to do duty at the doors and windows of their own houses, and to prevent all improper communications, to see that all susceptible articles of food were immersed for half an hour, at least, in water; that pigeons, rabbits and fowls were stripped of their feathers or skins; that wine was received in clean uncorked bottles; that all susceptible articles were carefully examined, and all filaments of wool, thread, feathers, &c., were removed by pincers and burned; that all coins were passed through vinegar, and that all contact with porters, carriers of provisions, or other persons was cautiously avoided. Besides these guards, one deputy and one clerk was appointed to each district, and such a number of sick searchers and police sergeants as might be required. The duty of the deputy with the aid of his clerk, was to make out an accurate return of the whole population within his district, and to



take care that at the door of each house, a list of all persons residing there was affixed, and which list was to be corrected weekly, and a copy thereof regularly transmitted to the inspector-general. It was also the duty of the deputy to call forth the inhabitants of such houses to see that they were in perfect health, and to make a report every three days, when no case of sickness occurred; but, when such case did occur, to make his report instantly to the inspector-general who was to communicate the intelligence to the proto-medico, that necessary measures might be adopted for ascertaining the nature of the complaint. If the disease, on investigation, was declared to be the plague, the parties infected, and the parties suspected, were equally sent to the Lazaretto, taking with them such articles of value or of furniture they might wish to save; and the moment they were removed, the white-washers and expurgators, preceded by beat of drum and sound of bugle, so as to warn all parties of their approach, marched to purify, expurgate, and to white-wash the infected house; and, in order that there might be no concealment, it was ordered that on no account whatever should a corpse be interred, without an antecedent medical examination directed by the proto-medico.

It is hardly possible to conceive that any community, unless strongly persuaded of the contagious nature of the plague, could submit to a system of discipline so severe, and which can be regarded as an evil, only inferior to the plague itself.

When the army was in Egypt, a minute inspection was made of every corps and of every department twice a-week, and every person with the smallest appearance of ill-health was sent to the hospital. Also, every corps or hospital, where a case of plague had appeared, was put into a state of quarantine; and in such hospital, an inspection was made by the surgeons at least two or three times a-day, and every case with suspicious symptoms, was ordered to the observation tent or room, and on symptoms of the plague appearing—such case was immediately sent to the pest-house. The men were likewise ordered to bathe more frequently, and

their clothes and bedding to be frequently washed and baked, while the quarters of the army\* were frequently changed.

Such are the preventative measures which have been raised as a barrier against the introduction of the plague into Christian Europe. "The dread of contagion," says Dr. Russell, "neither can, nor ought to be eradicated from "the mind of man."

\* The expense incurred by the French government, for the army alone, at the ports of Marseilles and Toulon, are stated by Clot-Bey, from the 1st of January, 1829, to the 31st of December, 1833, amounted to 2,630,718 francs 48 cents. The number of troops which performed quarantine at these two places, during those four years, were 48,409 men, and 1,268 horses and mules.—*De la Peste*, p. 434. In the port of Toulon, it is calculated, also, that the expense for the French navy, incurred from the same cause, must have been 5,625,947 francs 58 cents.





## CELLULITIS VENENATA.

THE posion or poisons absorbed in dissection, produce inflammation principally of the cellular tissue, either of the part, or of the limb, by which they have been introduced. They also occasionally produce inflammation of the cellular tissue of some remote part of the body, as in the opposite arm or side. These inflammations terminate by suppuration, gangrene, or other modes usual to the cellular tissue, and are often preceded, accompanied, or followed by a severe form of continued or remittent fever.





## OF THE POISON OF CELLULITIS VENENATA.

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By the term cellulitis venenata, is meant to be designated that disease which results from punctures received in dissection. It is certain that many persons must have fallen from this disease, either in consequence of wounds received in dissection, or else in the prosecution of their business, as butchers, farriers, cooks, &c., long before any recorded case is to be found. Dr. Colles was the first, perhaps, to draw the attention of the profession to this interesting subject, by the relation of two fatal cases, published in the third volume of the Dublin Hospital Reports. This example has been followed by Dr. Duncan, junior, in a very valuable paper in the first volume of the Medico-Chirurgical Society of Edinburgh, and subsequently by Mr. Travers, in his work on constitutional irritation, and lastly, six cases of much interest, have been reported in the twentieth volume of the Medico-Chirurgical Transactions, by Mr. Stafford. The facts thus obtained are not numerous, but they are too important to be overlooked in a work professing to treat of morbid poisons.

*Remote cause.*—This disease has always been consequent on the act of examining or dissecting the deceased human body, or else the dead body of some animal; and it has been a question whether it arises from the nature of the part injured, as the sheath of a tendon, or is owing to the generally impaired health of the party at the time of the accident, or whether it is the result of a peculiar poison introduced into the system. “We may admit the constitutional predisposition in all cases,” says Mr. Stafford,\* “and it appears to me, that the phenomena can only be satisfactorily ac-

\* Medico-Chirurg. Trans. vol. xx, p. 50.



“ counted for on the supposition of the introduction of an  
 “ animal poison. For we find the most alarming and rapidly  
 “ fatal cases to occur, where there has been but a slight  
 “ abrasion or scratch, as well as where a deeper wound has  
 “ been inflicted by the point of the scissors, the hook or the  
 “ scalpel, so as to render questionable the probability of  
 “ wounding the sheath of a tendon. Further, many cases  
 “ are recorded, in which no abrasion or puncture was no-  
 “ ticed, or any evidence of such injury found on the most  
 “ minute inspection of the part; consequently, some dele-  
 “ terious poison must have been absorbed.” In the case of  
 Mr. Pince,\* no puncture could be found. Dr. Duncan, also,  
 in a paper on diffuse inflammation, in the Transactions of the  
 Medico-Chirurgical Society of Edinburgh, mentions a  
 similar instance, where Mr. Cumming, a medical practitioner,  
 was present at the dissection of a young woman, who died  
 from puerperal fever. He took no share in the dissection, except  
 introducing a fresh thread into the needle which was em-  
 ployed in sewing the body, and was not aware of an *abrasion*  
 or of having *punctured himself in the act of threading*. Mr.  
 Blythe merely removed the serum from the cavity of the  
 chest with a cup, and afterwards discovered that he had a  
 small abrasion on the index finger, not larger than a pin’s  
 head. Mr. Young merely put his hand into the same cavity,  
 and compressed the lung. Mr. Rayner, at another examina-  
 tion, did nothing more than squeeze the sponge, but he had a  
 pimple on one of his fingers. While Higginbottom merely  
 assisted in removing a woman, that had died of typhus, from  
 the shell into her coffin, but he had a scratch on his left  
 thumb. In most of the instances, therefore, in which the  
 symptoms have been most severe and the result fatal, the  
 wound has generally been no larger than a puncture made by a  
 needle, or else a slight abrasion. As neither the nature of  
 the wound, therefore, nor the part affected, nor the state of  
 the constitution, will account for the occurrence of the re-  
 markable phenomena of this disease, it seems to follow as a

\* P. 59.

necessary consequence, that the remote cause must be a morbid poison absorbed into the system.

*Predisposing causes.*—This disease usually occurs in young men, or in persons of middle age, and in some cases, though by no means universally so, the suffering party has been impaired in health at the time of receiving the injury, or else in a state of health predisposing to the actions of this poison; for hundreds of punctures are inflicted with impunity for one that endangers life; and it frequently happens that two persons out of three, examining the same dead body, will escape, though suffering from similar punctures. In general, these accidents are not followed by any serious result in the strong and the robust, although the punctured part often inflames, festers, and is the seat of a small abscess. It is only when the patient has been weakened by hard study, excess, or previous disease, that the consequences assume a fearful aspect. The spring is supposed to be the season in which the greatest numbers are attacked.

*Contagious.*—It is admitted that medical students are liable, in a much greater proportion than other classes of persons, to diffuse cellular inflammation, and also that they are liable to this disease only during the period they are prosecuting their studies in the dissecting-room, or subsequently, at times when the duties of their profession impose on them the necessity of posthumous examination. It is, therefore, fair to infer, as they can cut or wound themselves with impunity at other times, that the instrument with which the puncture has been affected during these pursuits, must be armed with some deleterious agent, from which this too often fatal disease results, and the poison of the dead body is, consequently, in some instances contagious. There is much difficulty, however, in determining whether this agent is uniformly the same, and the product of animal decomposition, or whether it is the product of the disease under which the patient may have died, and varying according to the nature of that disease.

The agent to which cellulitis venenata is in general attributed, is supposed to be generated during the decomposition of dead animal matter; and the great probability of a poison



being generated during that process has been proved by Gaspard. This physiologist injected into the inguinal abdominal cellular tissue of a dog, about three ounces of water, rendered putrid by steeping in it raw and tainted meat. This animal exhibited signs of great pain during the injection, then refused all food, and soon became agitated, growled, and rolled himself on the ground. Some hours after this, his abdomen seemed to give him pain when touched, a hard, painful tumour formed in the groin, and the inflammation, which extended on every side, terminated in gangrene. The tumour now burst and sloughed, laying bare the abdominal muscles, the verge, and other neighbouring parts. But, notwithstanding this extensive affection, the dog ultimately recovered.\*

Haller has also remarked that putrid water,† injected into the veins of an animal is promptly fatal; and this observation is entirely confirmed by Gaspard, who states as the constant result of his experiments, in which putrid substances were either introduced into the veins of animals, or else injected into a cavity lined by a serous membrane, that a particular inflammation of the mucous membrane of the intestinal canal, accompanied by a passive hæmorrhage, always followed. He conceives, therefore, that as these pathological phenomena do not depend on continuity of tissue, but affect remote parts, they must be caused by a poison that has been thus introduced into the system.

M. Morand has related some curious observations,‡ which seem strongly to demonstrate the existence of this animal poison. “A large ox, unable to travel, (*mal à butin*), was “killed and cut up by a butcher, who put his knife, for a “short time, into his mouth, and was soon after seized with “swelling of the tongue and throat, and also with universal “gangrene, so that he died on the fourth day. An innkeeper “pricked his hand with a bone of the same ox, and a livid “tumour formed on the part, the arm sphacelated, and he died “on the seventh day. Some drops of the blood of this animal,

\* Magendie, *Physiologie*, tome ii, p. 20.

† *Physiologia*, tome viii, p. 154.

‡ *Histoire de l'Académie Royale des Sciences*, 1766, p. 54

“ also, fell on the hand of his wife, and the hand swelled, and  
 “ a tumour formed, which she had great difficulty in getting  
 “ cured.” In Rust’s Magazine, also, there is an account of  
 the occurrence of anthrax, in the district of Merseburg,  
 towards the end of June, 1822, of which no fewer than ten  
 individuals died; and it was ascertained that several of the  
 patients had been employed in skinning sheep and cattle  
 which had died of Blutseuche; and all these circumstances  
 seem strongly to prove the existence of the poison contended  
 for.

One remarkable circumstance, also connected with cellulitis venenata, seems distinctly to prove the existence of a particular and specific poison, and not a plurality of poisons; which is, that the same phenomena appear to result, or nearly so, after the examination of the bodies of patients who have died of the most opposite diseases. In Professor Dease’s case, for example, the patient had died from pulmonary consumption. In Dr. Pett’s case, the malady had been peritonitis. In Mr. Higginbottom’s, typhus. The patient examined by Mr. Blythe and Mr. Young had died of hydrothorax. While Dr. Dewar and Mr. Newby were infected from opening the bodies of patients who had died of enteritis. Mr. Burton died from examining an aneurismal sac; and Dr. Kelly, Dr. Andrews, and Mr. C. Cheyne of Leith, were all infected in various degrees, after having been engaged in the examination of a patient, in whom the cæsarean operation had been performed.

It is usually considered that animal matter, far advanced in a state of putridity, is the cause of this disease, but experience has shown that an advanced state of putrifaction is a protection to the anatomist, and that the greatest danger is to be feared from a recently dead body. As examples of this law, the disease was contracted by Mr. Archer, a dresser of Guy’s Hospital, in consequence of his examining the body of a patient that had died only the day before, and that in the depth of winter, or the 11th of February. Mr. Dease was infected by the body of a woman, who had died only forty-eight hours before, and also in February. The patient examined by Dr. Pett had been dead about the same time,



and the examination was made at Christmas. Mr. Delph and Mr. Smart were infected, May 11th, by the body of a woman who had died the same morning, and was still warm; and Mrs. Hodges was infected in consequence of hanging up a piece of fresh meat. It will be plain, from these instances, that the time which had elapsed from the death of the patient till the examination of the body was too short, as well as the time of year too cold to allow of rapid putrifaction.

The intimate nature of this poison is entirely unknown, and it is questionable whether it is either formed in the last moments of life, or is a product of incipient decomposition. It would appear that some bodies are more apt to generate it than others, for the same body has often infected two or more persons, who had been in the habit of making posthumous examinations for many years, without having previously suffered any ill consequence. Thus one body communicated the disease to Mr. Professor Dease and Mr. Egan; another to Mr. Hervey and Dr. Hennen, Jun., and in a slight degree, also, to Dr. Dumbreck; another to Mr. Young and Mr. Blythe, and another to Mr. Cumming and to Mr. Edie.

Some dead animal substances, also, appear more likely to communicate this dangerous disease than others. The brain in the recently dead body is extremely apt to produce it. The sero-purulent fluid found in the larger cavities is also greatly infectious. But the most dangerous animal fluid is that contained in the abdomen, after puerperal peritonitis, and also the serum found in diffuse or gangrenous inflammation. The white cancer of the liver, and the substance of other medullary tumours, is said to be very irritating. The dead bodies of animals are much less infectious than those of human subjects; nevertheless, persons who clean tripe, and horse-killers are said to be subject to erysipelatous or diffuse inflammation of the hands.

Although it is certain, therefore, from these facts, that the dead body is sometimes contagious, it is not determined by any case whether the disease excited in the living body is capable of being transmitted to a third party.

*Susceptibility exhausted.*—Some persons are so susceptible

of the infection from dead animal matter, that they seldom escape after receiving a wound in dissecting. The susceptibility to the poison is, therefore, probably never exhausted.

*Co-exists.*—There is no given state of the body known to give exemption from the action of this poison. It probably, therefore, is capable of co-existing with every other poison.

*Modes of absorption.*—It follows, from the data we at present possess respecting this disease, and also from the experiments of Magendie and of Gaspard, that this poison is absorbed by the cutaneous, the cellular, and the mucous tissues.

*Period of latency.*—The period of latency of this poison is unusually short. Thus, Mr. Elcock punctured his finger on opening a patient recently dead, at twelve o'clock; and the finger became so painful that he showed it to Sir Astley Cooper the same evening. Dr. Pett examined the body of a patient at eight o'clock in the morning, and in the evening of the same day he complained of uneasiness in the punctured part. In Mr. Percival's and also in Professor Dease's cases, the local symptoms were delayed till the morning following the examination. In the cases also related by Mr. Stafford, the disease manifested itself, in every instance, either the same day, or the morning following the examination. An instance of longer latency occurred in Mr. Newby—this gentleman opened the body of a child that had died of enteritis on Sunday, but it was not till Wednesday evening that he was laid under the full influence of this fatal poison, which, in a few days, destroyed him. The longest period of latency is that recorded by Dr. Spurgin of a cook maid, who had been practising on a stale hare, to learn the method of boning them; a few days after, two slight scratches, which she remembered to have received at the time, began to inflame, and a long and severe disease followed.

*Pathology.*—The theory of this disease is, that a poison, whatever be its intimate nature, is absorbed and carried into the circulating torrent, and, after a short period of latency, usually occasions only a diffuse inflammation of the wounded part, without any serious affection of the constitution. In other cases, however, in addition to the diffuse inflammation



of the part or limb, a severe form of fever is added with extreme prostration, coated tongue, and disturbed alimentary functions, and as the disease proceeds, abscesses are often formed in various parts of the body, remote from the original wound; usually beneath the great pectoral muscle, although not in the course of the absorbents leading from the hand to the sub-clavian vein. The poison, therefore, acts locally on the punctured limb, on the cellular tissue, generally, and also on the great nervous centres, producing the phenomena of fever.

The local phenomena, when the poison is of sufficient intensity to produce disease of any moment, are inflammation of the punctured part, involving not only the hand, but also the arm and oftentimes extending as far as the axilla. A more intense form of the disease, however, is when the inflammation of the punctured part is slight; but severe inflammation commences in the axilla, extending over the neck and down the side, and sometimes attacking remote and even opposite parts of the body. This inflammation may terminate by effusion of serum, by suppuration, or by gangrene.

In the first form of the disease, the wound, usually on the back or on the palm of the hand or on the fingers, inflames, followed by an ill-defined but general swelling of the whole hand and accompanied with throbbing pain. The inflammation may now extend up the arm to the axillary glands, so that the whole limb is more or less affected. This inflammation commonly affects, not only the cellular membrane external to the fascia, but also the sub-fascial cellular tissue. In slight cases, this inflammation terminates in effusion of serum, which being absorbed, the disease subsides. But in severer cases, suppuration takes place under the theca of the injured finger, while the whole limb may become either one diffuse abscess, or else a series of abscesses, and may terminate the life of the patient, either by keeping up a long continued discharge, or else by ending in gangrene. The absorbents are also, in some instances, inflamed, and their course marked by dusky, red lines, leading from the hand to the elbow joint. The axillary glands are also sometimes enlarged.

The inflammation often begins without any redness, but shortly after, an erythematous blush begins to spread up the arm, irregular in its outline, but abruptly defined. If the finger is placed within this coloured space, it gives exquisite pain, so that the patient convulsively shrinks, while beyond the margin, pressure produces no uneasiness. After these symptoms have lasted a day or two, the part loses its vivid efflorescence, is less exquisitely sensible to the touch, but the fulness increases with an obscure fluctuation, and the part has a quaggy, doughy feel, as if the cellular tissue was broken up. If the part be now punctured, a bloody serum only escapes; but should the patient survive a few days, pus of an unhealthy character is formed, and is discharged in great abundance; in short, it is a diffuse cellular abscess, not bounded by any adhesive inflammation. The same phenomena attend the inflammation of the pectoral region, which is often swollen, and the seat of pain for a day or two before the skin inflames and reddens.

After the death of the patient in such few instances as have been examined, the cellular tissue has been found variously inflamed in the parts affected, being loaded with serum in one part, with pus in another, and in a third, gangrened; and, in the latter case, the pus, as it flowed during life, was usually mixed with much sphacelated cellular tissue. The muscular fibre beneath the affected part, has been found softened, and has been more readily torn than usual; and in one case, quoted by Dr. Duncan, both layers of the intercostal muscles were destroyed and the ribs denuded. In some instances, the muscular fibre is paler than usual, in others, darker.

The axillary glands are usually enlarged and embedded in a highly diseased cellular structure. "But although a swollen and tender state of the axillary region is often one of the first symptoms observed, I have never found," says Dr. Duncan, "the glands so much diseased as to support the idea that they were the primary cause of the surrounding inflammation."

The second form of the disease, is when the injured part



is but triflingly affected or the seat only of a pock, a vesicle, or other slight inflammation, the fore-arm, and also the upper arm are free from disease ; but the inflammation begins in the axilla, and is followed by fulness of the neck, of the sub-clavian, humeral and pectoral regions. This inflammation sometimes spreads backwards over the scapular region and downwards by the serratus and latissimus dorsi muscles, and sometimes even as low as the thigh. Abscesses, also, sometimes form on the opposite side of the body ; but although the seats of these abscesses are something different to those in the former variety, the pathological characters are the same.

In many cases when the patient has recovered, it has been found in spite of all treatment, that the flexor tendons have sloughed, or else have been bound down by adhesive inflammation ; so that when the wound has healed, the finger has remained motionless and stiff.

The general or febrile symptoms give rise to the usual pathological phenomena of continued fever, or effusion between the membranes, while the substance of the brain is studded with points of blood.

*Symptoms.*—In a few cases, the disease commences with primary fever, and after this has continued a very few hours, the local inflammation appears. In the majority of cases, however, the constitutional affection is preceded a very few hours by the local disease ; but even in these cases, the fever has often greatly endangered the life of the patient before the local inflammation is clearly developed. In every case, the fever is typhoid in character with great prostration of strength, and profound dejection and depression of spirits. In general, however, the mind is collected, and the delirium seldom considerable, or occurs only at night, or towards the close of existence, except in a few cases, when it commences early, is violent, and continues throughout the disease.

In most cases, the local disease commences in the punctured part, and extends gradually up the fore-arm, and the arm to the axilla, whence it may spread, as in Dr. Pett's case, to the trunk of the body without leaving any sound interspace. The most alarming variety, however, is when

the affection follows the usual progress of inoculated diseases, a slight inflammation, a vesicle, or pustule forming on the part by which the poison has been absorbed; the severer inflammation attacking some remote part, not continuous with the seat of the primary pustule, so that no necessary connection can be inferred between the injury and the subsequent inflammation of the axilla or shoulder. In Mr. Cumming's case, for instance, a pimple arose on the finger, but soon healed. In Mr. Hutchinson's case, the scratch was quite free from inflammation, except that the cuticle was raised into a small flattened vesicle. The same appearance was observed in Professor Dease's case; for so slight was the local affection, that he did not appear conscious of having received any injury. A pustule was also observed in Mr. Hervey's case, but it gave him no uneasiness. In Mr. Blythe and Mr. Young's cases, the scratches gave some uneasiness, but were healed almost before the disease began.

The seat of the secondary affection in these cases was above the elbow, and chiefly in the axilla, whence the inflammation extended over the neck, and downwards along the sternum to the ileum; and in Professor Dease's case, also, it reached even to the middle of the thigh of the affected side. In most cases, it was confined both in the back and over the abdomen to the same side, limited by the mesial line, and only in a few instances has it passed that boundary. In other instances, as in Mr. Dewar's case, the disease commenced in the left axilla and passed to the right fore-arm; and in Mr. Cumming's case, it began in the left axilla, and passed to the right, where it terminated in gangrene.

The abscess which forms in the more dangerous cases of this disease, is always diffuse, has no tendency to point, and is only slightly elevated above the surrounding soft parts, while its limits are rarely defined by a margin. It is smooth and unequal, has no central hardness, or focus of greatest irritation, and its elasticity something between emphysema and adema, has been termed boggy or quaggy. If the glands, likewise, should be enlarged, it is only in a slight degree, and no hard or corded absorbent vessels can be traced to them.



In some cases, the inflammation runs its course and terminates in extensive suppuration without any redness of the skin; and in all cases of this disease, the cutaneous inflammation is secondary, and consequent on the inflammation of the cellular membrane. In Mr. Hutchinson's case, for instance, no redness of the skin appeared, even in parts most severely affected, until the disease began to remit, when a diffuse redness appeared.

The pain in the swollen part is generally exquisite. In Mr. Hutchinson's case it was his chief complaint, even while there was as yet neither discoloration or phlegmon. In Mr. Dease's case, the pain also preceded the redness and was almost intolerable. Dr. Pett suffered so much as to have observed that he had never before known what pain was; and in Mr. Clifton's case, it amounted to torture.

In several instances, the skin, so far from being hotter than usual, felt sensibly colder; while in others, the patients emitted, during life, a peculiarly foetid cadaverous odour. In Mr. Whitelaw's case, the sweat was so extremely offensive as hardly to be borne, either by himself or his attendants; and it was in such abundance as not only to wet his body-clothes and the bed-clothes, but it also stained them of a dark colour, difficult to remove by washing.\* The following cases will exemplify the general principles that have been laid down, and the first and second cases will show how slight a local disease will frequently destroy the patient.

Mr. Elcock, a student in anatomy, slightly punctured his finger in opening the body of a hospital patient recently dead. The inspection took place about twelve o'clock at noon, and in the evening of the same day (Monday) finding the wound painful, he showed it to Mr. Cooper (Sir Astley), after his surgical lecture, by whom he was referred to Dr. Haighton, in whose house Mr. E. at that time resided, and he applied a poultice to the finger, and took some opening medicine. During the night, the pain increased to extremity, and symptoms of high constitutional derangement presented themselves on the ensuing morning. No trace, however, of

\* Medico-Chir. Trans. Edin. vol. i, p. 505.

inflammation was apparent, beyond a slight redness of the spot at which the wound had been inflicted, which was a mere puncture. In the evening, he was visited by Dr. Babington, in conjunction with Dr. Haighton and Mr. Cooper, still no local change was to be discovered, but the nervous system was agitated in a most violent and alarming degree, the symptoms nearly resembling the universal excitation of hydrophobia, and in this state, he expired at three o'clock on Wednesday morning, within the short period of forty hours from the injury.\*

Mr. C——, aged twenty, was attacked with a severe rigor on the morning of Friday, the 9th of January, 1834. He complained of pain in the left pectoral muscle extending to the axilla. He had some head-ache, a quick and hard pulse, and a hot and dry skin, but no appearance of inflammation could be discovered. On Saturday and Sunday nights, he was restless, but on Monday night he was turbulent, and at times, violently delirious. On Wednesday, he passed the greater part of the night in a state of insensibility, interrupted by paroxysms of fierce delirium, and was now apparently exhausted and sinking. On the evening of this day, he raised his hand in his delirium, and exclaimed, "here's a big fellow," when the nurse discovered that the fore finger of the left hand was considerably swollen. On the following day, Mr. Travers saw him, and found the finger swollen and tense, and some inflamed absorbents extending from its base a short way up the wrist. A purple spot appeared on the integuments of the ribs and iliac region of the left side; it was very slightly, if at all tumid, but evidently tender to the touch, and upon incision about half a tea-spoonful of pus escaped from the finger. This gentleman expired on the night of the sixth day of the attack. It was not known to his attendants up to Wednesday, that he had either wound or scratch, but on a minute examination, a cicatrix was discovered at the extremity of the affected finger. He had been dissecting ligaments.† The following case created a

\* Travers on Constitutional Irritation, p. 203.

† Ibid, p. 249.



great sensation among professional men at the time, and is an instance of the patient being destroyed by inflammation, extending from the punctured and immediately surrounding parts up the arm.

Dr. Pett examined the body of a patient, that had died of puerperal peritonitis, at eight o'clock in the morning of Saturday, the 28th of December. On the evening of the same day, he complained of feeling some heat and uneasiness on the outer side of the last phalanx of the middle finger of the hand, and suggested he might have pricked himself in the morning. Mr. Toulmin examined the finger cursorily, but found no wound. There was, however, a slight blush upon it, and by a stronger light, and by the aid of a lens, a minute opening was discovered in the cuticle, and in the centre of the redness before observed; and this spot was touched with a pointed piece of nitrate of silver, and, subsequently, with a very small quantity of nitric acid. In the course of the night, Dr. Pett again touched the part with the nitrate of silver, and the pain produced, he said, increased to agony. He got into bed, and was shortly after seized with violent shivering, followed by some degree of heat.

“About one o'clock,” says Mr. Toulmin, “I accompanied my father—on entering the room, it was impossible not to be struck with his extreme altered appearance. His countenance was rather suffused with redness, his eyes were hollow and ferrety, and there was a peculiarity in his breathing, which never forsook him during his illness. It was a suddenness and irregularity in the act of breathing, amounting almost to sighing. His manner, usually gay and playful, was now marked by excessive torpor. Indeed, his whole appearance reminded me of a person who had taken an excessive dose of opium. His pulse was between ninety and a hundred, and rather soft. Dr. Pett described himself as having suffered intensely. He said he was completely knocked down, and that he had not the strength of a child.

“Upon removing the poultice, the finger and hand appeared more swollen than in the morning, the skin of the

“ last and middle phalanges was very tight, and of a blueish  
 “ livid appearance, with effusion under the cuticle surrounding  
 “ the crust, where the caustic has been applied. A lancet  
 “ was passed freely into this and down to the bone; some  
 “ bloody serum escaped, but it gave no pain. The last and  
 “ middle phalanges were, in fact, completely gangrenous.  
 “ The inflamed absorbents could be traced to the elbow, and  
 “ there was uneasiness in the axilla.

“ On Tuesday morning, we found things looking worse  
 “ than before. Dr. Pett’s general appearance and powers  
 “ were more sunk, the pulse was quick and more irregular—  
 “ the breathing more oppressed, and that torpor of manner  
 “ which was present at first, was converted into restless  
 “ anxiety. There was, however, no increase of inflammation,  
 “ or extension of gangrene on the hand; but the same kind  
 “ of virulent inflammation, which had existed in the finger,  
 “ seemed to be proceeding in the axilla and parts adjacent.  
 “ The skin over the axilla and side of the chest, was marked  
 “ by an erysipelatous blush, and pitted on pressure. Dr.  
 “ Pett died in the evening of the following day, or on the  
 “ fifth from the examination of the body.” There does not  
 appear to have been any examination of the local disease,  
 or of the head after death in this case, but all the other  
 viscera were healthy. The following case is an example of  
 a remote local affection following the puncture.

Mr. Dease, late professor of anatomy and surgery to the  
 Royal College of Surgery in Ireland, lectured on the cervical  
 nerves and brachial plexus. The subject which had been  
 dissected for him was a female, about forty years of age, and  
 had died in one of the hospitals of a chronic pulmonary  
 affection. The lecture was delivered at one o’clock on Satur-  
 day, and on Sunday morning early, he awoke with a violent  
 shivering and sickness of the stomach, the former being very  
 severe, while the latter continued upwards of two hours. He  
 complained also of acute pain in his left shoulder.

“ He sent for me,” says Dr. Colles, “ at half past eleven  
 “ o’clock, and earnestly besought me to bleed him, for the



“ pain in his shoulder, which he described as very severe,  
 “ and as aggravated on the slightest attempt to move the  
 “ arm. I found him, as I supposed, labouring under high  
 “ symptoms of the prevailing fever, and conceiving that his  
 “ complaints of the arm were, in some measure, the effects  
 “ of impatience, I declined bleeding him. At three o’clock,  
 “ p. m. I again saw him, and although I was still of opinion  
 “ that he was affected with common fever, attended with  
 “ derangement of the stomach, greater than ordinary, yet I  
 “ could no longer resist his importunate solicitations to be  
 “ blooded, and I took away nearly twenty ounces of blood  
 “ from his arm by a large orifice, and the blood flowed freely.  
 “ He thought himself relieved of the pain in his shoulder  
 “ while the first cup was filling, but this was probably ideal,  
 “ as he did not express relief towards the conclusion of the  
 “ operation, and as I found his pain not at all mitigated at  
 “ nine o’clock p. m., when the fever was as high as it had  
 “ been at any time of the day—the blood was neither buffed  
 “ nor cupped, and the proportion of serum was considerable.  
 “ I now observed a slight fulness above the clavicle, along  
 “ the side of the neck, in the space of the sterno-mastoid  
 “ and trapezius muscles; and being in doubt whether this  
 “ apparent fulness might not be owing to the position of the  
 “ head, which was held rather towards this side, I wished  
 “ to satisfy myself by the touch, but on applying my finger,  
 “ even with the slightest pressure, he complained of exquisi-  
 “ site pain.

“ Monday morning, February 15th.—I was called up at  
 “ eight o’clock this morning to see him, and found he had  
 “ spent a very restless night, owing to the pain in his should-  
 “ der; and when I went into the room, he had the entire  
 “ joint covered with leeches, to the amount perhaps of one  
 “ hundred. We advised a draught with elect. scam. fomen-  
 “ tations and an opiate liniment. At five o’clock p. m. we  
 “ met again, Dr. Sheridan, Dr. Brooke, Mr. Richards and  
 “ myself. We learned that the draught was rejected almost  
 “ as soon as it had reached the stomach, and although the

“ pills had brought away some liquid stools, yet the fulness  
 “ of the abdomen remained unreduced. No relief had been  
 “ derived from the fomentations and liniment.

“ At nine o'clock p. m. on Tuesday.—On visiting him  
 “ this evening, he accidentally mentioned an uneasiness he  
 “ felt in his left side. On examination, I discovered a co-  
 “ lourless swelling on the side of the thorax, a little behind  
 “ and below the posterior border of the axilla. On my sug-  
 “ gesting to him my suspicions of the cause of his sufferings,  
 “ Mr. D. denied having received any cut, of which he was  
 “ so positive as almost to refuse to let me examine his hand.  
 “ I discovered on the dorsum, rather towards the ulnar side  
 “ of the second joint of the thumb, the mark of a slight  
 “ scratch not a quarter of an inch long; this formed the  
 “ diameter of a vesicle, which was almost half filled with a  
 “ fluid of milky whiteness and consistence.

“ Friday, February 19th.—Had a very bad night. Some  
 “ delirium this morning, but is now, at half past eleven, more  
 “ composed; face with a yellow tinge, countenance sharp,  
 “ yet not indicative of much pain or inward distress—pulse  
 “ smaller. He desired me to look at the right arm which  
 “ had been blooded. I found the incision inflamed in the  
 “ ordinary way, but I remarked on the fore-arm about two  
 “ inches below the incision, a small vesicle, containing a  
 “ fluid like that produced by the original wound on the  
 “ thumb.

“ Saturday, February 20th.—At our visit this morning  
 “ eleven o'clock, we observed his manner quick and border-  
 “ ing upon delirium—pulse 126 and smaller. The entire  
 “ side from a very little below the axilla down to the hip  
 “ was swelled. This day we observed the swollen part  
 “ studded pretty thickly with small elevations, to the eye,  
 “ like vesicles, but hard to the touch. They bore a resem-  
 “ blance to the elevations which arise in the cicatrix of a  
 “ part which had been scarified when it is affected with  
 “ swelling.

“ An erysipelatous blush which had been first observed on  
 “ Thursday and had rather increased on Friday, was now  
 “ more strong, but occupied only a small portion of the mid-



“dle of the swelled side. On Sunday morning at twelve  
 “o’clock, the inflammation of the side extended up to the  
 “axilla, and the posterior edge of the axilla appeared as if  
 “there were an abscess, but without fluctuation—colour of  
 “the inflamed part darker. He has passed no urine since  
 “nine o’clock last night. We now observed a swelling on  
 “the anterior part of the right arm, and occupying about  
 “a hand’s breath of the belly of the flexor muscles, beginning  
 “about one and a half inches below the orifice made in  
 “bleeding him. We agreed to puncture this tumour, although  
 “he appeared fast approaching to dissolution. A quantity  
 “of serous fluid, near a tea-spoonful followed, but did not in  
 “the slightest degree diminish the swelling. He died at  
 “ten o’clock at night, being the eighth day from the acci-  
 “dent.

“On a superficial examination of the body on Monday, I  
 “observed that two or three vesicles had formed on the  
 “back, about the size of a small bean. The swelling had  
 “extended down the thigh; the left arm was rather har-  
 “dened from the elbow nearly up to the shoulder. The  
 “swelling was chiefly along its anterior surface, but it could  
 “be also felt around.”\* In the following case, the poison,  
 in the opinion of Mr. Stafford, must have been absorbed by  
 the cutis, and without breach of surface.

“On Sunday, 2nd of March, 1833, at eight o’clock in the  
 “morning, I received a note,” says Mr. Stafford,† “from my  
 “friend Dr. Sims, informing me that the absorbents of his  
 “right fore-finger and fore-arm were inflamed, in conse-  
 “quence, as he supposed, of his having dissected a brain on  
 “the preceding day. I immediately went to his house, and  
 “we both very minutely examined the finger. There was an  
 “elevated spot on the inner surface of the second phalanx,  
 “resembling the bite of a gnat, but we could not discover on  
 “any part of it, not even by a magnifying glass, the slightest  
 “trace of a puncture. The finger was extremely painful and  
 “considerably swollen and inflamed. The inflammation of

\* Dublin Hospital Reports, vol. ii.

† Medico. Chirur. Trans., vol. xx, p. 53.

“ the absorbents extended in two or three distinct lines along  
 “ the inner side of the fore-arm, nearly up to the ulnar  
 “ side of the elbow joint. On the night before, Dr. S. went  
 “ to bed in his usual health—at four o’clock in the morning,  
 “ he was awoke by the pain in his finger, at which time he  
 “ got up and took a five grain dose of calomel. The pain  
 “ and inflammation gradually got worse, and at eight o’clock  
 “ the hand and fore-arm were in the state I have already de-  
 “ scribed. The pulse was hard and at ninety, having that  
 “ thrilling or jerking stroke which indicates constitutional  
 “ disturbance. The tongue was coated by a dirty white fur,  
 “ and the skin was somewhat hotter than natural. Eight  
 “ leeches were applied to the finger, an evaporating lotion on  
 “ the fore-arm and a senna draught taken. From the rapid  
 “ progress of the inflammation of the absorbents, the case  
 “ put on an increasingly unfavourable aspect. Between  
 “ twelve and one, Dr. Lee called upon him—he was then  
 “ much worse; the pain in the finger had greatly increased,  
 “ and the inflammation of the absorbents had extended  
 “ nearly to the axilla. The pulse was small and irregular,  
 “ varying from 120 to 130. There was a peculiar physical  
 “ anxious expression of the countenance, accompanied with  
 “ a nervous tremor over the whole frame; the voice was  
 “ tremulous, and occasionally there was a transient inco-  
 “ herency, which, however, Dr. S. appeared conscious of  
 “ and could immediately command. In addition to these  
 “ symptoms, he suffered a most excruciating pain in the  
 “ lumbar region, which caused a constant involuntary tremor,  
 “ itching of the lower limbs and more particularly on the  
 “ right side. In fact, the whole nervous system appeared to  
 “ have received so great a shock, that the symptoms almost  
 “ resembled those produced by the bite of a venomous rep-  
 “ tile.

“ As the symptoms were rapidly increasing in severity,  
 “ we felt it our duty to call in the most able and experienced  
 “ members of the profession. In the mean time, however,  
 “ the nitrate of silver was rubbed on the surface of the arm,  
 “ along the course of the absorbents, about three inches in



“breadth and two in length, with a view of arresting the  
 “progress of inflammation. Sir Astley Cooper and Mr.  
 “Lawrence were sent for. We met Mr. L. between two and  
 “three o’clock in the afternoon, Sir Astley being out of town.  
 “The symptoms were advanced in severity—there was a  
 “depression of the nervous system, as if a fatal change  
 “might soon take place. The tremors continued—the pulse  
 “was extremely small, faltering and irregular—there was a  
 “cold clammy perspiration on the skin. The pain and in-  
 “flammation of the finger and fore-arm had greatly increased,  
 “and the pain in the back was almost insupportable, attended  
 “in a much greater degree with the convulsive twitchings of  
 “the lower limbs. In our consultation, the indications ap-  
 “peared to be—to lessen or oppose the further progress of  
 “inflammation, and to tranquilize the nervous system by  
 “the application of leeches—the employment of fomenta-  
 “tions—keeping the patient under the influence of opium as  
 “long as the pain continued, and administering aperients  
 “until the bowels were freely relieved.

“Twenty more leeches were immediately applied to the  
 “fingers, and along the course of the inflamed absorbents, the  
 “hand and the arm were afterwards well fomented. Twelve  
 “grains of the compound powder of ipecacuanha were taken,  
 “but immediately rejected. A fourth of a grain of muriate of  
 “morphia in solution was therefore substituted.

“Eight o’clock, p. m.—The bowels had acted three times  
 “without the repetition of the aperient. The muriate of  
 “morphia had produced some relief, the pain in the finger and  
 “back were somewhat lessened. The tremors and muscular  
 “twitchings were much the same. The finger still more  
 “swollen and tense, and the palm of the hand and third  
 “phalanx swollen. Inflammation of the absorbents not re-  
 “duced.

“A deep longitudinal incision was made along the flexor  
 “tendons of the second phalanx but no pus escaped. To  
 “continue the fomentation and apply twenty more leeches to  
 “the hand and absorbents. Repeat the muriate of morphia  
 “as often as occasion may require.

March 3rd, four o'clock, a. m.—After the leeches had been applied, and the morphia taken in the evening, Dr. S. dosed for an hour or two. When the muriate of morphia had been taken an hour or two, all the symptoms abated. The pulse was reduced from 130 to 100, and beat with a firmer stroke. The tremors were lessened, and the pain in the back and hand considerably diminished. The effect of the morphia had now ceased, the pain in the hand and particularly in the finger, was excessive. The pulse had increased to 140 and wavered irregularly. The tremors and twitchings of the limbs were still more violent than they had been, and the pain in the back excruciating. The depression of the nervous system was even greater than it ever had been, so much so, that unless relief could be obtained, a speedy dissolution might have been expected. Half a grain of muriate of morphia was immediately given—the effect was remarkable. In five minutes it began to act. The pain gradually diminished; the tremors and twitching of the limbs were alleviated; the frequency and unsteadiness of the pulse, being only between 90 and 100, diminished, and the patient fell sleep. In two hours, however, all the symptoms began to return. The same dose of muriate of morphia was administered with the same good effect, and ordered to be repeated every second hour, as long as the symptoms demanded it.

“Eight o'clock, a. m.—The hand in much less pain, the swelling had increased on the third phalanx and palm of the hand. The inflammation of the absorbents had remained nearly the same—if any thing, slightly abated, and the tremor and pain in the back continued, but were alleviated. The pulse from 103 to 110, slightly irregular and faltering—tongue coated with a brown fur.

“Twenty leeches were applied to the absorbents, and most painful part of the hand—to continue the morphia, the fomentations and poultice. He was allowed fever diet, but could take nothing but soda and seltzer water, and an occasional cup of tea. Sir Astley Cooper met us in consultation to-day.



“Eight o’clock, p. m.—During the day all the symptoms  
 “were alleviated. The tremors were lessened; the pain in  
 “the back was not so violent; the pulse was more equal,  
 “averaging 100, and the inflammation of the absorbents was  
 “somewhat diminished, but the hand as to pain remained the  
 “same. The swelling of the third phalanx, however, was  
 “greater and more tense, but no pus had apparently formed.  
 “Ordered twenty leeches to the hand and absorbents, to con-  
 “tinue the fomentation and poultice, and still to be kept un-  
 “der the influence of the morphia.

“March 4th, eight, a. m.—Had passed a better night, having  
 “had two hours sleep. The tremors and pain in the back much  
 “better. The third phalanx of the finger more swollen and  
 “tense, but the absorbents less inflamed; signs of the forma-  
 “tion of matter were not evident; pulse 98; skin moist;  
 “tongue covered with a dirty white fur; bowels had not  
 “acted; ordered a mild aperient and to continue the other  
 “treatment.

“Three o’clock, p. m.—Finger more painful and tense and  
 “swollen; slight fluctuation on the third phalanx could  
 “be felt; a deep longitudinal incision was made into it, and  
 “pus made its escape with the blood. To foment, poultice,  
 “&c., as before.

“Eight, p. m.—Finger much relieved, and the other symp-  
 “toms diminished.

“March 5th, eight, a. m.—Slept at different times during  
 “the night. Better in all respects: an opening made into  
 “the swelling on the palm of the hand, and pus evacuated—  
 “to go on with the treatment.

“In a day or two, the several wounds in the finger were  
 “laid open together, so as to make one continued incision  
 “from the point of the finger into the palm of the hand.  
 “This gave great relief by removing the excessive tension of  
 “the parts. Several other collections of matter formed in  
 “different parts of the palm, and were opened as soon as  
 “discovered.

“From this time, the constitutional symptoms gradually  
 “abated. The inflammation of the absorbents subsided, and

“ the openings made into the finger and hand discharged pus  
 “ freely. Poultices were constantly applied, and the hand fre-  
 “ quently fomented. The morphia was gradually diminished  
 “ in quantity; his diet improved and tonics administered.  
 “ Dr. S. was, at length, able to get into the country, and after  
 “ an illness of six weeks, he was restored to his usual health.  
 “ In defiance of all treatment, the flexor tendons sloughed,  
 “ and consequently when the wounds were healed, the finger  
 “ remained motionless and stiff.

“ The first circumstance which may be observed in this case  
 “ is, that no wound took place, nor was there any abrasion of  
 “ the cuticle. It would appear, then, that absorption by the  
 “ skin had taken place.”

As this disease has often been compared to the bite of the snake, the following cases are added as an exemplification of this opinion :

“ Drake, an Englishman about fifty years of age, on his way to Paris for the purpose of exhibiting three rattle snakes, after travelling all night from Havre, reached Rouen on Wednesday morning. On his arrival, he found the most beautiful of the three, in spite of all his care and precaution, dead, and he drew it out of the cage with a pair of tongs. But to his great grief, he thought that one of the others gave no sign of life, and he had the rashness to open the cage, and to take hold of this reptile either by the tail or at some distance from its head, when excited by the touch, it darted at the man, and bit him in the dorsum of the left thumb, and again on the palmar surface of the same hand, when Drake, who had not quitted his hold, immediately replaced him in his cage. This took place at half past ten o'clock in the morning—Drake immediately washed his hand in iced water, and in the space of three or four minutes, had applied a ligature tightly immediately above the wrist, and sent for a physician. ‘ I arrived in ten or twelve minutes,’ says Dr. Pihorel, ‘ after the bite. The man was pale and agitated, ‘ a cold sweat fell from his brow, and his eyes were haggard. ‘ I gave him half a glass of olive oil, whilst a fire was lighted ‘ to heat a partridge spit which happened to be at hand, and



‘the operation of actual cautery was practised within from eighteen to twenty minutes after the accident.’

“Five minutes after the operation, he sat down, his head fell on his chest, and he sank into a stertorous syncope, passing his urine and fœces involuntarily. In this state, with his extremities cold and almost pulseless, he was about twelve o’clock put to bed, when he was so far roused as to render some assistance in undressing himself. At half past twelve, he vomited, and also at one, and his hand was now observed to be swollen around the bitten parts, and was painful. At three, he was better, his pulse being only eighty in a minute; but it was remarked that when he drank, he always used the bitten hand, complaining he could not use the other, although accustomed to do so in health.

“At five o’clock he felt pain in the left shoulder, and the upper lip was also visibly swollen. This was followed by difficulty in swallowing, and by stertorous breathing, which increasing, he expired at quarter past eight the same evening. It should be added that the ligature was not removed from the arm till after the actual cautery had been applied, nor until the hand was blue and swollen, and the numbness quite insupportable.

“After death, no discolouration of the hand or arm, or of the lip was to be seen, neither could any diseased appearances which could be referred to the action of the poison, be discovered in any part of the body.”

This is a powerful instance of a poison being absorbed into the system, and destroying the patient almost before any local affection was set up. The following case, on the contrary, will show how extensive and fatal a local disease follows the bite of the *cora de capello*, when the poison is of less intensity, or the patient less susceptible of its action.\*”

“Thomas Soper, twenty-six years of age, on the 17th of October, 1809, went into a room in which two healthy rattle snakes, brought from America the preceding summer, were exhibited. He teased one of them with the end of a foot-rule, but could not induce the snake to bite. The rule having dropped out of his hand, he incautiously opened the

\* Philosophical Trans., 1810.

door of the cage to take it out, when the snake immediately darted at the hand and bit it twice in succession, making two wounds on the back part of the first phalanx of the thumb, and two on the side of the second joint of the fore finger. This bite took place at half past two o'clock, and he went immediately to Mr. Hanbury, a chemist in the neighbourhood. On his arrival, there was no swelling on the hand, and the man was so incoherent in his language and behaviour, that Mr. Hanbury conceived him to be in a state of intoxication. After leaving Mr. Hanbury, his hand began to swell, which alarmed him, and he went to St. George's Hospital. He arrived there at three o'clock, with the wrist-band of his shirt unbuttoned, from the swelling extending itself half way up his fore-arm. The skin on the back of his hand was very tense and the part very painful, and at half past four, the swelling had reached half way up the arm, and the pain had extended to the axilla. At half past eleven, the hand, wrist, fore-arm and arm were much swelled up to the top of the shoulder and the axilla. The arm was quite cold, and no pulse could be felt in any part, not even in the axilla; the wounds made on the thumb were just perceptible, those on the finger very distinct. On the following morning, there was a fullness down the side, and blood was extravasated under the skin as low as the loins, giving the back on the right side a mottled appearance. Vesications now formed—the whole arm became livid—an obscure fluctuation was felt, and the part being punctured, only a small portion of a serous fluid was discharged. On the 28th of October, a slough had begun to separate from the inside of the arm below the axilla; and on the 29th, a large abscess had formed on the outside of the elbow. At length, mortification took place in the skin near the axilla, and he died at half past four in the afternoon of November the 4th, having survived eighteen days.

“On examination, that part of the back of the hand which immediately surrounded the wounds made by the fangs, for the extent of an inch and a half in every direction, as also the whole of the palm, was in a natural state, except that



there was a small quantity of extravasated blood in the cellular membrane. The orifice of the abscess was enlarged, so as to form a seam on the outside of the arm, elbow and fore-arm, near six inches in length. Around this, the skin was in a state of mortification more than half way up the outside of the arm, and as far downwards as the outside of the fore-arm. The skin still adhered to the biceps flexor muscle in the arm, and flexor muscles in the fore-arm, by a dark-coloured cellular membrane. Every where else in the arm and fore-arm, from the axilla downwards, the skin was separated from the muscles, and between these parts there was a dark-coloured fluid, with an offensive smell, and sloughs of cellular membrane, resembling wet tow, floating in it. The muscles had their natural appearance every where, except on the surface which was next the abscess. Beyond the limits of the abscess, blood was extravasated in the cellular membrane, and this appearance was observable on the right side of the back as far as the loins, and on the right side of the chest, over the serratus major anticus muscle.

It will be plain from this case, that the most extensive local disease, spreading from the punctured part, may follow the introduction and absorption of a poison; and, consequently, entirely supports the doctrine of a poison having been absorbed in cellulitis venenata.

*Diagnosis.*—This disease is to be distinguished from typhus by the existence of the local affection, although when that is slight, as in Mr. Dease's case, the diagnosis for a time is doubtful.

Cellulitis venenata is distinguished from erysipelas by the history of the case; by its attacking the axilla, and lateral portions of the trunk without the intermediate parts of the arm being affected. It is also to be distinguished from inflammation of the cellular membrane of the abdominal muscles by the previous history, and by its remote connection with the axilla and the punctured part.

*Prognosis.*—Slight affections are seldom fatal, and the great majority of cases are of this description. In the severer forms of the disease it may be stated, as a general result, that almost all escape when the inflammation is limited to the lower arm,

and does not terminate in gangrene. On the contrary, few survive in whom the axilla forms the *principal* seat of the disease, without any obvious connection with the punctured part, and it is equally fatal in those in whom the inflammation extends from this part over the neck and down the side, even when the connection is obvious and complete. Dr. Lendrick says,\* “he does not remember a fatal case where inflammation of the lymphatics and abscess in the axilla took place.” And Mr. Travers is of opinion,† that a bold inflammation of the absorbents and their glands, of the cellular membrane, the fascia, nay even of the vein, to be a much less dangerous action than that which affords the first and principle manifestation of its character in its effects on the constitution. Phlegmon, or acute abscess, is, therefore, always to be viewed as a favourable occurrence, but indolent suppuration or chronic abscess, though the pus may appear healthy, is always a source of apprehension.

When the pain is so severe as to amount to neurosis, as in Mr. Elcock and in Mr. Clifton’s cases, it marks a formidable, but not always fatal disease.

*Treatment.*—When cellulitis venenata has been of such severity as to merit a record of the case, it would appear, all theory apart, that whatever has been the mode of treatment, one half of the patients have recovered, and one half or nearly so have died. In the cases recorded by Dr. Duncan, junior, of Mr. Blythe and of Mr. Young, each treated as nearly similar as possible, the one died and the other recovered. Of eight cases that were bled or leeches, or underwent both operations, four died, and among them, Mr. Cumming who was bled four times from the arm, and had four dozen leeches applied. While the four others, similarly treated, and among them Mr. S. who was twice bled to syncope, recovered. Of the cases reported by Mr. Travers—Professor Dease was bled to twenty ounces, and had one hundred leeches applied to the shoulder, and yet he died, while Mr. Clifton bled to a still greater amount recovered. Eight other cases are recorded

\* Dublin Hospital Reports.

† Constitutional irritation, vol. i. p. 222.



that were treated by antiphlogistic medicines, by leeches, and by poultices, and of these, four died, and four recovered. Of two treated by tonics, one died and one recovered, while in Dr. Pett's case, the treatment was complex, and he died.

In looking to these very opposite results we cannot be surprised that with materials so scanty to guide us, that the most opposite opinions should prevail on the treatment to be pursued in cellulitis venenata ; for while most practitioners persevere in bleeding, Richeraud and Dr. Lendrick condemn that practice in the most unqualified terms, the latter affirming " that it is almost as invariably prejudicial and in some cases is as much so as a similar mode of treatment would prove in genuine typhus fever, or in delirium tremens." Mr. Stafford is of opinion, " there may be individual cases where the patient is of so plethoric a habit or so inflammatory a tendency, that the abstraction of blood may be required ; generally speaking, it appears to me that it would be better to avoid it.\* It is palpable, whatever may have been its effects on the constitution, it has had little effect on the local disease which has pursued its course uninterruptedly and terminated in suppuration."

Calomel has been used in almost every case in greater or less quantities, and certainly with very doubtful effect. Dr. Lendrick even thinks it injurious, and says when he has given calomel, " I have generally found it produce those symptoms which usually warn us of the unhealthy action of mercury, and in some cases, though combined with opium, it ran readily to the bowels," and he adds, " I must protest against dosing the patient with relays of calomel, and black bottle for the purpose of cleansing his tongue."

In the more advanced stages of the disease, Dr. Lendrick is of opinion that stimulants should be had recourse to, and more copiously than in other forms of fever, but this treatment, he says, may also easily be overdone, and the latent spark of visceral inflammation be readily excited. There are no facts, however, to warrant this latter supposition. He also recommends opiate enemata, as well as the acetate of

morphia combined with the citrate of ammonia and Hoffman's anodyne for the purpose of procuring sleep, and of preventing the morbid reaction of the mind upon itself. Mr. Stafford appears to prefer the muriate of morphia, as having an immediate effect in producing composure, and keeping down the violence of the pain. "It appears advisable, therefore," he adds, "to administer it in such doses and with such frequency as to keep the patient under the influence of its action."

Such is the general treatment of this formidable disease, as far as regards the use of our more powerful remedial agents; the exhibition of the ordinary remedies, and especially of those necessary to regulate the bowels, must be left to the discretion of the practitioner.

With respect to the local treatment, it may be laid down as a general principle, that inflammation once established, a termination by resolution is out of the question, and that the best chance of recovering the patient, is to adopt such measures as may lead to a healthy local suppuration, and the means proposed for this purpose, are, topical bleedings, cauterization, the application of heat or cold, of opiate, or of stimulant liniments and the practice of incisions.

"Although it appears to me," says Mr. Stafford, "that general blood-letting is not advisable in most cases of injury from absorption, (excepting under peculiar circumstances,) yet, on the other hand, I consider topical bleeding of the greatest consequence, indeed, so important does it appear, that I feel persuaded that without its employment, when the inflammation of the hand and absorbents is very great, the patient has but little chance of recovery. Blood, therefore, should be abstracted by the repetition of leeches on the inflamed part or any swelling arising from the wounds along the course of the inflamed absorbents, and on the glands of the axilla, or any other part, where their employment may be required." Dr. Lendrick, also, is of opinion, that leeches act, not by preventing suppuration, as is contended for by Mr. Stafford, but rather that they favour it, and with this object, he adds, "at any rate they afford relief, and provided they be not had recourse



“ to such an extent as to debilitate the patient, their application is always to be recommended.” In addition to leeches, soothing local applications, as poultices and fomentations must be applied to the wound, and to the inflamed parts. Sometimes the local pressure of these means is intolerable, when the local steam bath occasionally affords much relief. As an useful auxiliary to these warm applications, lint dipped into a mixture of oil of turpentine and of laudanum, and covered with the poultice or fomentation is beneficial and gives relief, and, according to Dr. Lendrick, accelerates the suppuration. For the same purpose, Dr. Osborne has proposed pledgets dipped in the Træ cantharides. In some cases, warm applications, however administered, instead of bringing relief, increase the sufferings of the patient when cold evaporating, or other lotions, applied round the affected limb should be substituted.

As another means of stopping the extension of the local inflammation, Mr. Stafford thinks, “ whether the absorbents “ are inflamed or not, it would be advisable to rub the argen- “ tum nitratum on the cuticle across the course of the absor- “ bents about two inches in breadth and sufficient to blacken “ the surface. If the absorbents are not inflamed, its appli- “ cations on the fore-arm should take place as near the hand “ as possible, but if they are inflamed, it should be employed “ above the point to which the inflammation has extended.”\* This measure, however, appears little consonant to what we know of the laws of morbid poisons, and the cases in which it may have succeeded, are too few to lead us to adopt it as a rule of practice.

It not unfrequently happens that in spite of all our endeavours, pus will form in the hand, the arm, the axilla, or in the side, so that the patient may be suffering most distressing pain from the great tension of the part, and this accompanied by a fluttering pulse, delirium, and great prostration denote an exhausted and dangerous state. Under such circumstances, whether pus be or be not formed, ought the swelling to be incised? Mr. Stafford thinks it ought, “ and as the “ chief object, if matter be not formed, is to relieve the tension

“ of the part, that the incision made should be of considerable  
 “ length.” Dr. Lendrick is likewise of opinion, “ if there be  
 “ proof that the patient’s sufferings are attributable to the  
 “ parts being girt down by a tense fascia, there can be no  
 “ doubt of the propriety of affording relief by incision. But in  
 “ the majority of cases,” he adds, “ the excessive pain is not  
 “ referable to such a cause, and speculative incisions only in-  
 “ crease the patient’s torture, for I have been informed by  
 “ patients that their sufferings, both general and local, were  
 “ increased by it.” Of course, if a superficial abscess be  
 formed, or it can be rendered probable that suppuration has  
 taken place, the propriety of making an opening cannot be  
 doubted.

The last stage is where the abscesses are discharging pro-  
 fusely, and the patient is reduced by the continuance of the  
 suppuration. Under these circumstances, the treatment con-  
 sists in giving power and support by means of quina and  
 opium, of wine and porter, of meat and nourishing diet of  
 every description that the stomach can bear. The abscesses  
 must be treated according to the usual principles of surgery.

*Dietetic and preventative treatment.*—In the early stages  
 of this disease, the diet of the patient should be strictly limit-  
 ed to farinaceous food, to slops and the usual diet observed  
 in fever. In the latter stage, and after suppuration has  
 formed, fish, poultry or meat, should according to the circum-  
 stances of the case be liberally afforded.

As to the prevention of this frightful disease, the puncture  
 is generally, in the great majority of cases, not followed by  
 any serious result, that apprehension is unwise, and precaution  
 almost impracticable. Persons predisposed, if such a condi-  
 tion can be predicated, should avoid, if possible, dissection  
 altogether, and more especially of the bodies of persons that  
 have died of suppurative inflammation, and particularly while  
 the body is fresh.

The means of prevention after the accident, recommended  
 by Dr. Lendrick, whether the part be sucked or not, are wash-  
 ing the wound with a saturated solution of alum and nitre in  
 equal parts. “ This practice,” he says, “ has been adopted for



“ years by Dr. Macartney, who keeps several vessels of the so-  
 “ lution ready prepared, and directs his pupils to wash them-  
 “ selves when injured, or suspecting they may be so, and it ap-  
 “ pears, that although diffuse inflammation has been prevalent  
 “ elsewhere in Dublin, not a single case has occurred in his  
 “ dissecting establishment, at least when this preservative was  
 “ had recourse to.”

The most certain preventative is unquestionably the appli-  
 cation of caustic to the puncture, immediately after receiving  
 the injury. It will have been seen in the case of Dr. Pett and  
 others, that having recourse to this operation some hours  
 after the accident, is perfectly useless. When trial was made  
 by Dr. Russell of the effects of actual and other cautery, in  
 preventing the effects of the poison of the rattle-snake in  
 animals, he says, “ on comparing the various results, it suffi-  
 “ ciently appeared that the remedy often failed, though ap-  
 “ plied from four to fifteen minutes after the bite, and that  
 “ it almost invariably failed when applied later,” and so doubt-  
 ful is Dr. Russell of any good effect having been produced by  
 these means, that he adds, “ that a much greater number of  
 “ trials would be required for ascertaining the merit to be as-  
 “ cribed to caustics.” It, of course, follows, that after the ap-  
 plication of the caustic, that the part should be covered by  
 strapping, and, if possible, the party ought to abstain from  
 practical dissection till it be healed.

## F A R C I N O M A.

The farcinomatous poison produces in man, symptoms not greatly dissimilar to those of acute glanders, and of farcy in the horse—or, fever followed or preceded by a number of inflammatory tumours in different parts of the body. These tumours are the result of a specific action of the poison, and have a great tendency to suppurate and to fall into gangrene. The duration of this disease varies from a few days to many months.





## OF THE POISON OF FARCINOMA.

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THE horse, the ass and the mule, are liable to a disease termed the glanders. It occurs under two forms, or the glanders and the farcy. Many veterinists have considered these varieties to be distinct diseases; but numerous experiments have demonstrated that they have their origin in one common animal poison. These affections have been supposed to be peculiar to the monodactyles,\* but it has been determined by a variety of accidents occurring to persons immediately employed about glandered horses, that this poison is capable of being transmitted from the horse to the human subject, and again from the human subject to the horse and to the ass; and there is reason to believe it has been communicated from one human being to another. The attention of the profession was first called to these important facts by the publication of Mr. Muscroft in the *Edinburgh Medical and Surgical Journal*,† in the year 1821, of the case of the whipper-in of the Bardworth hunt, who wounded himself in cutting up a glandered horse for the kennel, and died at the end of a week of confirmed glanders. Two years after, there appeared in the same work,‡ two similar instances, or that of a veterinary surgeon who contracted an inflammation of the arm from a glandered horse, of which he was supposed to have died; and, likewise, a case which occurred in one of the London hospitals. In the latter case, an ulcer of the arm was produced by contact

\* M. Prinz, professor of veterinary medicine at Dresden, says he has seen the goat and the sheep affected with the glanders, and states he has succeeded in inoculating dogs.—Rayer. p. 639.

† Vol. xviii, p. 321.

‡ Vol. xix, p. 823.



with the leg of a glandered horse, and from this ulcer, pus was taken, and being inserted into the leg of an ass, produced glanders, so that the identity of the disease was distinctly proved.

These cases excited little notice when Mr. Travers published his valuable work on Constitutional Irritation, in 1828, containing a letter from Professor Coleman on the transmission of glanders from the horse to man, and from man to the ass, together with some other cases which had fallen under his own observation. The subject was now followed up by Dr. Elliotson in two papers in the transactions of the Medico-Chirurgical Society,\* narrating three cases which had occurred in his own, Dr. Root's and Dr. Williams's practice, and since that time, many other practitioners have published similar instances in the different periodical journals. Such is the history of glanders in the human subject in this country, and it appears that similar facts were observed about the same time on the continent, first by Schuling in 1821,† a surgeon of a Prussian regiment of horse, and, subsequently, by Hertwig, Brera, Vogeli, Wolf and others. At length, all the then known facts, together with one new case were collected, and published in an elaborate paper by Rayer, in the sixth volume of the *Mémoires de l'Académie Royale de Médecine*.

Veterinists consider glanders in the horse to be a general disease with local lesions, and they distinguish two if not three kinds. The one consists of ecchymosis and gangrene, principally of the pituitary tracheal or bronchial membrane; the other, of a pustular eruption of the same parts, followed by ulceration; while the third is a combination of these two forms of disease.

In *gangrenous glanders*, called by M. Dupuy, *coryza gangréneux*, the animal at the commencement loses its spirits, staggers in its walk, and the pituitary and conjunctival membranes, if examined, are found to be inflamed and dotted with a number of red points. At the end of twenty-four

\* Vols. xvi and xviii.

† Rust's Magazine, vol. xi.

to forty-eight hours, these red points enlarge and become livid, and the nostrils now discharge a yellow matter, streaked with blood. This state lasts two or three days, when the pituitary membrane falls into gangrene, and large ulcers form on the portions which have sloughed. The discharge now increases, and exhales a foetid gangrenous odour—the respiration becomes difficult, and the animal quickly dies, with his legs, scrotum and nostrils in a state of œdema.

On opening the animals who have fallen from this affection, the nasal mucous membranes are found to be softened, ulcerated and gangrened, and covered with a number of black spots. Similar ecchymoses are seen also on the tracheal and bronchial mucous membranes, while the substance of the lungs is frequently the seat of many petechial or gangrenous points. In this disease, the blood is sensibly altered, and said to be contagious.

In *pustular glanders* there is the same general debility and fever as in gangrenous glanders. The specific inflammation of the pituitary membrane, is an eruption of pustules, said to resemble the confluent small-pox, red at their base and white at their summits, followed by an abundant yellow viscid discharge from one or both nostrils. At the end of two, three or more days, these pustules ulcerate, sometimes internally, so as to affect the bones and cartilages of the nose. From the absorption of the morbid secretion from the nose, the sub-maxillary glands become swollen and tender, but only on that side of the head which is inflamed, and this enlargement of the glands is termed by the farriers, the *kernals*. The mucous membrane of the nostrils, the hind limbs and the sheath, are, as in the gangrenous form, œdematous. At length, the nostrils being glued together, the respiration becomes difficult, while the weakness and marasmus increase, so that the animal dies about the eighth or tenth day, or even sooner. This disease is always contagious, and when prolonged is said often, or perhaps invariably, to end in farcy.

On opening animals that have died of this affection, the nasal mucous membrane is found covered with the eruption,



also thickened in some parts, and extensively ulcerated in others, while the sinuses are often filled with a sanies mixed with blood. Sometimes, also, the mucous membrane of the trachea and larynx is the seat of a pustular eruption and ulceration, similar to that of the pituitary membrane. The maxillary glands are enlarged, red and infiltrated with serosity, a portion of the sub-cutaneous cellular tissue, also is the seat of ecchymosis and of serous infiltration.\*

Of farcy there are two kinds, the *bud-farcy* and the *button-farcy*, and these may be either acute or chronic. The *button-farcy* consists of the formation of a number of tumours in different parts of the body, as the head, neck and extremities, particularly the hinder ones. The peculiar character of these tumours is, that they are formed not only by enlarged glands, but also by inflammation of the cellular tissue, and at the end of four or five days, they soften and ulcerate. Similar tumours are said to form also in the substance of the pituitary membrane, which quickly suppurate and cause death.

The *bud-farcy* is an inflammation of the lymphatic vessels and glands, without involving in any considerable degree the cellular tissue. It usually commences in the hind extremi-

\* The chronic glanders appear to be essentially different from the acute glanders. It commences by an enlargement of the sub-maxillary lymphatic glands, or by a whitish discharge usually from the left nostril, and which has been compared to the white of an egg. By degrees the symptoms increase, and the glands are more swollen, harder and apparently adherent to the maxillary bone, while the discharge, although purulent, is so viscid as to glue the sides of the nostril together. The pituitary membrane is now seen, discoloured and covered with a number of white points, which are tubercles in a state of crudity. These tubercles, at length, soften, and the mucous membrane covering them ulcerates. The enlarged glands, also, often contain tubercular matter, a circumstance which never occurs in acute glanders, and is alone a sufficient diagnostic symptom between the two diseases. This affection is consistent with a tolerable share of good health, and the horse continues for a long time able to work. In France, it is popularly believed to be contagious, and horses labouring under it, are prohibited from being seen on the public roads; but repeated experiment has proved it to be *non-contagious*.

ties, causing lameness and enlargement of the limb. This enlargement, though general, is not uniform, for the surface of the limb is irregularly swollen, increasing and decreasing in many parts. The glands of the affected limb are also enlarged and painful, especially those on the inner surface of the limb. In some instances, the progress of the inflammation is arrested by a thickened valve forming a tumour, popularly called the "*farcy bud*." If nothing has been done, these indolent tumours enlarge, become hot and painful, and at length ulcerate, discharging a thin sanies. Sometimes the buds are connected by an inflamed lymphatic vessel, which is now termed "corded vein," or supposing it to be large "farcy pipe." The inguinal glands, and also those of the legs, often inflame and suppurate.

Chronic glanders do not differ from acute glanders except in duration, for there is the same endless formation of tumours in various parts of the body, only they are indolent and hard, or should they at length suppurate, they discharge a peculiar viscid whitish pus. They have, also, little tendency to heal, but on the contrary, a great disposition to spread, and it eventually often happens that tubercles, or vomicæ form in the lungs, or the nose becomes affected, or large masses of the skin become diseased and thickened, as of the neck, withers or croup. Another form of farcy is, the horse being lame in one limb, the heat and tumefaction suddenly subside, and by metastasis, the other limb becomes similarly diseased. Glanders is always a grave disease in the horse, and so generally fatal, that it is a received rule in farriery, when the animal is of little value, to sacrifice it at once, and in all cases, not to expend more than one tenth of its value on the cure. Farcy is a less grave disease, and is often recovered from. As glanders is often accompanied by farcy, so farcy often ends in glanders.

*Remote cause.*—The remote cause of glanders in the horse is but little understood, and whether it is an atmospheric poison which has a peculiar affinity for, and acts on the horse and other monodactylous animals, or whether it is a



poison spontaneously generated in these animals under peculiar circumstances is altogether unknown. The glanders, however, where they affect the human subject, have, in all instances, been distinctly traced to the glandered horse, as their remote cause, and no case is known of their occurring primarily in man.

*Predisposing causes.*—In the horse, certain predisposing circumstances greatly favour the spread of the glanders, as well as the generation of the poison. Mr. Youatt states,\* “that the glanders are, in a manner, the consequence of “stabling the horse;” and all farriers are agreed that dirty, close, ill-ventilated stables, out of which the dung is seldom removed, and the situation low and damp, are fruitful sources of this disease. Mr. Coleman states, that in the expedition to Quiberon, in 1795, the horses had not been long on board the transports, which were crowded with them, than it became necessary to shut down the hatches; and the consequence was, that some were suffocated, and the rest became farcied. The Arabs, also, in transporting horses to India, always choose that part of the year when the passage is shortest, least the accidents incident to a longer voyage, might oblige them to close the hatches and give rise to glanders. Bad food, also, is a powerful predisposing cause in the horse, especially when these animals are picketed together on service, and thus exposed to the inclemency of the weather. At the close of a campaign, the cavalry is often more than decimated by this disease, and towards the termination of the Peninsular war, the losses from this cause were dreadful. It is observed that young, weak, light-coloured horses are most liable to this disease. The cases occurring in the human subject, are too few to allow of any inference being drawn as to influence of predisposing causes in the production of the disease, but they have all occurred in young men, and, probably, a close investigation would have shown that the habits of the patients were such as to fall within those laws, which favour the production of the disease in the horse.

\* Lancet, 1832, p. 469.

*Contagious.*—The general facts which establish the law of the contagious nature of this disease in the *horse*, are that the immense majority of veterinary surgeons, of stable-keepers, and coach proprietors believe in this doctrine, and every body must have heard this class of persons complaining of a glandered horse having been introduced into their stables, and that their stock have almost immediately fallen ill of the disease. There are few districts, also, in which some farmer, by the loss of a considerable part of his team, has not had sufficient proof of the contagious nature of the glanders. In this country, the law is severe against offering for sale or even working a glandered horse; which shows, that the opinion of our ancestors, time out of mind, has been, that glanders is a contagious as well as a fatal disease. In Germany, the belief of contagion is so general, that it is said, the law directs every horse that has been in contact with a glandered animal, shall be immediately killed.

The particular facts which prove the law of contagion in the *horse*, are that Professor Coleman has produced the glanders, by direct inoculation, from horse to horse. Also, that Professor Peal, by merely smearing the nasal mucous membrane of an ass with farcied virus, has produced a highly glandered state of that animal, the disease appearing at the end of eight days. A remarkable case is likewise given by Renault, in which acute glanders were produced in consequence of his injecting a centilitre of yellow liquid, taken from the sinuses of a glandered horse, into the jugular vein of a healthy horse;\* while Leblanc assures us that he has repeated these experiments till he has demonstrated, not only that the glanders are contagious, but that the farcy and glanders are mere varieties of the same disease, the farcy matter producing glanders, and the matter of the glanders, farcy.

The proofs of the transmission of the glanders from the horse to man, are that every case of this singular disease which has occurred in the human subject, has been in grooms or

\* Bulletin des Sciences Médicales, vol. v. p. 45.



persons who have had either the care of, or else been recently in contact with a glandered horse. It seems certain, also, that veterinary surgeons had long been aware that much precaution was necessary in opening or dissecting a glandered or farcied horse; for that punctures, under such circumstances, had produced grave accidents, and even death; but they do not appear to have been aware that the disease so produced was the glanders. This important fact was first proved by Professor Coleman, by whose direction two asses were inoculated with matter taken from an abscess in the arm of Mr. Turner, then labouring under disease, caused by a puncture received in dissecting a glandered animal, and they both died of the glanders. These experiments have been repeated with similar results, by Gerard, Hering of Stuttgart, and more recently by Leblanc with matter taken from a patient that died, glandered, under Rayer; so that no doubt can be entertained of the truth of this fact. It seems, therefore, established that the glanders are transmissible from the horse to man, and again from man to the ass. It has been contended, also, if the glanders can be communicated from man to animals, they must be capable of being communicated from one human subject to another; and a case of this description appears actually to have occurred in St. Bartholomew's Hospital only a few months ago, when the nurse, a healthy woman, contracted the disease from a patient in the ward, and after a short illness, died with every symptom of the glanders.

The glanders, however, are not eminently contagious, even in the horse, for numbers escape, even after contact with the matter. They are not so contagious as the mange or distemper in dogs, "for if they were," says Mr. Youatt, "the breed of horses would soon be swept away."

Neither is the poison of the glanders in the human subject eminently contagious, so that the number of persons who contract glanders, compared with those who have the care of glandered horses, is extremely small. The glanders were known to Aristotle and also to Pliny, but no instance is mentioned by these writers, or their successors, till a very recent period, of

the glanders being transmissible from the horse to man. Even within the last century, more than twenty veterinary schools or hospitals have been established in different parts of Europe, but the disease has, till recently, been unknown, both to the professors and students. Bartholemy observes, that during the revolutionary wars in France, the glanders prevailed to a great degree in the cavalry, and that thousands were sent into the interior in that state. At this period, upwards of six hundred were collected together at the school of Alfort, but notwithstanding this vast assemblage of disease, none of the soldiers employed to dress them, nor of the students who prescribed for them, were known to have suffered from the disease. The farcinomatous poison, therefore, like many other animal poisons, does not infect all who may be in contact with it, but requires some peculiarity in the constitution, or other predisposing circumstance in the recipient favouring its actions, to produce the disease. In general, the parties who have contracted the glanders have been of intemperate habits, or laying about in lofts, or of indifferent health at the time of their falling ill of the disease.

*Fomites.*—The fact of repeated inoculation with glandered virus, distinctly shows that fomites may be so infected as to produce the disease. The spread of the disease has also been attributed to healthy horses having drank out of the same pail or trough with a glandered horse—or to a glandered horse licking the neighbouring rack, or the partition of the stalls. Mr. White attributes the occurrence of the glanders in a mare and two foals, to some hay which had been left by a team of glandered horses, being blown into their paddock.

*Susceptibility exhausted.*—The great fatality which has attended this disease, has rendered it impossible to illustrate this law.

*Co-exists.*—The number of cases of glanders which have occurred in the human subject, are as yet too few to enable us to illustrate this law.

*Modes of absorption.*—The farcinomatous poison has been



introduced into the system both by the cutaneous and the mucous tissues. Thus glanders have been produced by inserting the virus under the cutis with a lancet, and by rubbing it on the greasy heal of a horse. They have also been produced by inoculating the mucous membrane of the nose of the horse, or else by smearing that membrane with farcied matter. Farcied matter has, also, been made up into balls and introduced into the stomach of a horse, and the glanders have resulted. There can be no doubt, therefore, that the poison is absorbed both by the mucous and cutaneous tissues, and that being absorbed, it infects the blood. This latter fact has been distinctly proved by Professor Coleman. "I have," says this gentleman, "produced the disease by first removing the healthy blood from an ass until the animal was nearly exhausted, and then transfusing from a glandered horse blood from the carotid artery into the jugular vein of the ass. The glanders in the ass was rapid and violent in degree, and from this animal, by inoculation, I afterwards produced both glanders and farcy. In acute glanders, the blood is undoubtedly affected."

*Period of latency.*—The poison of the glanders has its period of latency like all other morbid poisons, and that period is in general short. Two asses were inoculated by Mr. Turner, the one about a year and the other a year and a half old, and in the first, the maxillary glands became tender on the second day, and the discharge from the nostrils was established on the third. In the other, the maxillary gland enlarged on the third day, but the discharge from the nostrils did not take place till the sixth day. Sometimes, however, the incubation is much longer. In the Procès Verbal de l'Ecole de Lyon,\* a case is given of a horse which was inoculated with farcy matter, in which the disease did not appear till the end of three months, and then precisely at the points of puncture. M. Gerard, an ex-veterinary surgeon of the French "Artillerie de la Garde," states that he intro-

\* May, 1811.

duced the matter of the discharge every day, at different times, into the nostrils of certain horses by means of a brush, and that the disease appeared in one on the seventh day, but in two others not till the thirty-second day.

In the human subject, the poison has, in general, been latent from two to eight days, or, at least, the patient has, in general, continued well during that period after the accident of the application of the matter to a sore or to a puncture.

*Pathology.*—The theory of this disease is, that the poison of the glanders being absorbed, infects the blood, and after a given period of latency, produces, in slight cases, an abscess at the point of puncture, followed by some farcy, button or bud tumours in the course of the absorbents. In severer cases, the phenomena of fever with delirium are primarily set up, and after these have continued for a greater or less length of time, often for some days, there follows either a diffuse or eruptive inflammation of the mucous membrane of the nostrils, and of the trachea running into ulceration or gangrene—some affection of the substance of the lungs, together with the usual farcy button or bud tumours, in different parts of the body. The phenomena which have been described, are nearly similar to what has been observed in the horse, and that the buds or tumours are the result, in many cases, of the special action of the poison, seems proved by their occurring in parts and in limbs quite distinct from the one originally punctured.

In the cases collected by Rayer, the nose and nasal fossæ have only been examined four times out of fifteen; but in those cases, there has been ecchymosis, ulceration or gangrene of the mucous membrane of the septum, or else granules in the sinuses. The mucous membrane of the larynx or trachea, has, likewise, been found studded either with the peculiar eruption as in Rayer's case, or else diffusely inflamed, or ulcerated, so much so, that in one case, the epiglottis was in part destroyed. The lungs have, likewise, been found either gorged with blood, or else the seat of lobular pneumonia or of vomicae. In Dr. Root's case, there was an encysted abscess of the lung, which contained about



two ounces of pus. Besides these affections of the more vital organs, a number of small farcy tumours have been found in different parts of the trunk and extremities, and perfectly remote from the point originally punctured. These tumours are in different states of inflammation, some being white and indurated, others soft and purulent, and small abscesses have been found among the muscles. In Dr. Root's case, an abscess on the back of the right hand communicated with the articulation of the metacarpal bone, and in another case, an abscess had opened into the knee joint. The absorbent vessels have been, likewise, found inflamed along the arm from the point of puncture, and the glands to which they lead have been found enlarged and indurated, or in a state of suppuration.

*Symptoms.*—Glanders is a disease consisting of primary fever and of local inflammation, but the local inflammation may occur independantly of the fever. When the inflammation exists *per se*, the disease is termed chronic glanders—when the two are combined, it is termed acute glanders. The proportionate number of cases of each kind is not determined.

Acute glanders is ushered in by an attack of primary fever, with or without rigors. This is followed by pains in the limbs, so severe as often to be mistaken for an attack of acute rheumatism. Some days after, the pained parts become the seat of phlegmonous tumours, accompanied with much pain, redness and tenderness. These more commonly terminate in abscess, sometimes discharging a laudable pus, but more usually a bloody sanies, and rapidly becoming gangrenous. Towards the close of the disease, in eleven out of fifteen cases,\* there has been a discharge of matter more or less purulent, viscid and mixed with blood from the nostrils, and in ten of these cases, the discharge was from both nostrils. The quantity, however, has in general been inconsiderable, and sometimes scarcely appreciable. The period at which this symptom appears is not constant, for it has been seen

\* Rayer, p. 725.

as early as the fourth and as late as the sixteenth day. In the course of the disease, also, the eyelids are generally tumefied, and discharge a thick viscid matter, like that from the nose, and an enlargement of the sub-maxillary gland has been observed in one case.

One of the most remarkable symptoms of acute glanders in man, is the eruption of pustules on the face, trunk, limbs and genital organs. This eruption has been compared to the varicellæ, to the small-pox and to ecthyma; but, in fact, is 'sui generis,' and cannot be compared to any other. It has been observed to occur about the twelfth day, and to be preceded and accompanied with profuse foetid sweats. Besides this eruption, a number of black bullæ have been observed on the nose, forehead, below the ears, on the fingers, toes and genital organs—and these have been followed by gangrene, more or less extensive and deep.

The pulse is quick and full in the early stages, but towards the close, becomes rapid, small, irregular, and even intermittent. The tongue varies as in typhus, being first white and coated, and subsequently brown or black. Diarrhæa and meteorism often complicate the disease, and black blood has been observed in the stools.

Cerebral disturbance has come on as early as the second day, but more commonly not till towards the tenth—sometimes marked by a singular want of intelligence—at others, by a sinister presentiment, followed by stupor and death.

Acute glanders is rapid in its course, and two thirds of the cases have terminated before the seventeenth day—two have died on the twenty-first day, one on the twenty-eighth day, and only one has survived till the fifty-ninth day.

Chronic glanders, or acute farcy, differs from acute glanders in the circumstance of the local lesion preceding the general febrile derangement. The introduction of the poison being followed in a few hours by inflammation of the lymphatics of the wounded part, and extending sometimes from the fingers to the elbow and axilla, and involving the axillary glands. This is followed by inflammation and extensive abscesses in the sub-cutaneous cellular tissue, involving



the whole limb. From this state, the patient may recover, but should they be multiplied over various parts of the body, and accompanied either by the pustular or gangrenous vesicular eruption, or both, the result is generally fatal, for the customary hectic symptoms supervene, and hasten the final catastrophe.

This disease has terminated in a fortnight, more commonly has not proved fatal till the end of a month, and in cases still more chronic, a twelvemonth has been known to elapse before the patient finally recovered, or else died.

Such are the general symptoms of glanders, acute and chronic as they have been observed in the human subject. It will be proper, however, as the cases are rare, so that many practitioners have never seen one, to give a few particular instances. The best examples will be those in which matter taken from the patient, has, by inoculation, produced glanders in the horse or in the ass, so that no doubt could be entertained of the nature of the disease.

“A man named Prost, aged fifty-eight years, was admitted  
“into La Charité on the 9th of February, 1837, under Rayer.  
“He had been ill for some days, but could give no account of  
“the cause of his illness. On being put to bed, he lay on his  
“back; the expression of his countenance was dull and stu-  
“pid, and his mind confused, passed rapidly from one subject  
“to another. His person being examined, many phlyzacious  
“pustules were seen on the abdomen, chest and face, and  
“a large gangrenous spot was discovered on the glans penis.

“The general symptoms were fever, with a small and fre-  
“quent pulse, a dry and coated tongue, and great thirst, and  
“the abdomen was also meteorized. In the course of the  
“night, this patient passed many stools, and his urine flowed  
“involuntarily; he had some cough, but without expectora-  
“tion. As the prostration was extreme, it was supposed he  
“was labouring under some unusual form of typhus fever.

“On the next day, Rayer submitted this patient to a more  
“rigorous examination, and was again struck with the pecu-  
“liarity of the pustular eruption, some portions resembling  
“globular varicella, others ecthyma, and others rupia sores.

“ He discovered, also, a large gangrenous phlyctena under  
“ the left ear, surrounded by a number of rose coloured vesi-  
“ cles. On the left cheek, also, there was a large pustule, de-  
“ pressed at its centre and scabbed while on the right shoul-  
“ der, there were three large abscesses, besides thirteen more  
“ on different parts of the body. All these abscesses were  
“ soft, and contained fluid, but the skin was not discoloured,  
“ except on the shoulder, where they were slightly rosée, nor  
“ were they painful, with the exception of one on the ankle.  
“ Three of these abscesses were opened, and the pus, though  
“ yellow, held a white substance in suspension. Those  
“ opened after death contained a bloody sanies. On the sa-  
“ crum, and round the ankles, were some violet-coloured spots,  
“ the precursors of gangrene.

“ The singular phenomena which the case presented,  
“ caused some enquiry to be made into the habits of the man,  
“ and he was found to be a groom, who slept in a stable be-  
“ longing to M. Leblanc, a veterinary surgeon, and which had  
“ been filled with glandered horses. That gentleman also  
“ stated, that Prost had slept near to a mare glandered at  
“ both nostrils, and farcied at the cheek and shoulders, which  
“ had been sent to the knackers as lately as the 1st of Febru-  
“ ary, after ten or twelve days sickness. This enquiry con-  
“ firmed Rayer in his opinion that this anomalous affection  
“ must be the glanders, an opinion which was confirmed by  
“ M. Leblanc, whose knowledge of the disease in the horse  
“ is undoubted.

“ The general prostration which had been at all times great,  
“ now increased, but the local symptoms remained nearly  
“ stationary, for the abscesses did not extend, nor did the  
“ gangrene make new progress. There was no discharge from  
“ the nostrils in this case, but the patient expectorated a thick  
“ viscid matter, either from the nose, throat, or lungs, although  
“ its precise seat could not be determined. He died on the  
“ 15th of February, about five o'clock in the evening.

“ When the body was examined, its surface was still covered  
“ more or less with the pustulous eruption and gangrenous  
“ bullæ which have been described. Some of the pustules



“ were examined, and, when in the early stage, they were found  
“ to contain lymph, the corion being diminished at least two-  
“ thirds in thickness, so that they resembled the structure of  
“ the variolous pustule with the exception of being neither  
“ circular nor depressed at their centre. At a more advanced  
“ stage they were found scabbed in the centre, like rupia, and  
“ contained a pale rose coloured liquid pus.

“ The abscesses also of the right shoulder of the arms, and  
“ the lower extremities were found situated below the apo-  
“ neurosis, and between, and in the thickness of the muscles.  
“ There were others, also, between the periosteum and the  
“ bone. The greater part contained blood and pus, or rather  
“ a mixture of those fluids mingled together.

“ On the right side of the glans penis, the whole thickness  
“ of the mucous membrane was in a state of gangrene, while,  
“ the substance of the glans was infiltrated with black blood,  
“ and here and there points and streaks of pus, presenting a  
“ series of pathological phenomena not seen in any other di-  
“ sease.

“ The eruption also extended over the mucous membranes  
“ of the nasal fossæ, and of the larynx, where it resembled  
“ small confluent variolous pustules. The mucous membrane  
“ of the larynx was also sensibly thickened, so that the  
“ aperture of the glottis was diminished, and the cavity of  
“ the ventricles almost obliterated. The bronchial membrane  
“ was violet coloured, and on its surface, some points of pus  
“ were discovered. On cutting into the lungs, some small  
“ abscesses were found on their substance, and on their su-  
“ perficies.

“ The arachnoid contained more fluid than in health, and  
“ some points of blood were effused into its cells. The brain  
“ was marked with more red points than usual, but its sub-  
“ stance was healthy, except a serous cyst of the size of a  
“ nut which was found in the inferior portion of the poste-  
“ rior lobe of the right hemisphere.

“ A short time before the death of Prøst, matter was taken  
“ from the gangrenous bullæ below the ear, also from a pus-  
“ tule in the fore-arm, and likewise from an abscess in the

“ back, and about an hour after, M. Leblanc, in the presence  
“ of Rayer, inoculated a mare, foundered in the fore-legs,  
“ but she ate with appetite, and was in all other respects  
“ in good health. On the 15th, the punctures inflamed, and  
“ the symptoms augmented in intensity till the twenty-first  
“ day from the time of inoculation, when the animal labouring  
“ under a severe form of pustular glanders and acute farcy was  
“ sacrificed.”

It seems demonstrated, then, that as matter taken from Prost, produced glanders in a healthy horse by inoculation, that the disease under which that man laboured, must have been the glanders.

The following case was considered to be so indubitably glanders, that matter was taken by Mr. Youatt from the patient, and an ass was inoculated with it, but a student ignorant of this circumstance bled the animal, and produced phlebitis, of which it died before the farcinomatous poison had time to produce any other effect than a slight tumefaction of the punctured points.

“ William Johnson, aged 23, was admitted on the 31st of  
“ January, 1833, into St. Thomas’s Hospital under Dr. Wil-  
“ liams. This patient complained of tightness across the chest,  
“ and of pain in the right side and loins, in consequence, as he  
“ imagined, of a fall from a horse about three months before.  
“ He had also much thirst, a tongue coated with yellow mu-  
“ cous, and a pulse about 90. These symptoms had nothing  
“ characteristic, but as the disease advanced, they assumed a  
“ peculiarity which caused them to be watched with much an-  
“ xiety, for without any considerable fever, he became incohe-  
“ rent in his answers, and his tongue was tremulous. On the  
“ 10th, he was seized with an attack of delirium so furious, that  
“ it was necessary to strap him to the bed. He was still, how-  
“ ever, capable of giving some account of himself, and complained  
“ of gnawing pains in all his limbs, of great difficulty in moving  
“ his left arm, every joint of which was painful, and the knuckle  
“ of the fore-finger and hand was red, swollen, and painful.  
“ There was also a profuse sour and offensive perspiration. The  
“ disease was now considered to be an attack of acute rheuma-



“tism. On the 14th, however, an offensive yellow discharge  
“took place from the right nostril, and a large swelling arose in  
“the middle of the forehead of a purplish hue, and the left eye  
“was nearly closed, and numerous tumefactions took place on  
“the arms and legs, while several phlyzacious pustules were  
“seen on the left side of the neck. The pulse was 112.

“The man was now questioned as to his occupation, when  
“he stated he had been grooming a glandered horse, kept in a  
“stable by itself, and that he remembered the discharge from  
“the nostril had frequently fallen upon his hand, where the  
“scar of a wound was still visible; he added, also, that he was  
“satisfied his disease was the glanders, and that he should die  
“happy, and ‘like his horses.’

“On the following day, the 15th, the whole scalp had be-  
“come tumefied, the forehead purplish, the eyelids red and  
“shining—the sensation in his throat and nostrils was burn-  
“ing—his thirst intense, and more tumefactions appeared on  
“the extremities and abdomen, while several phlyzacious pus-  
“tules appeared on the left side of the body; the discharges  
“from the skin and bowels continued copious. The pulse was  
“counted 124.

“On the 16th, the discharge from the nostrils, chiefly from  
“the right, was very considerable, and of a glutinous and  
“brownish character, and ran in a continued stream down the  
“face and neck. The thirst was unquenchable—another  
“purple tumefaction appeared on the right side of the nose,  
“near the inner canthus, and soon increased so as to occupy  
“nearly the whole of that side of the nose. On the 17th, he  
“died early in the morning.”

At the autopsy, on cutting into the tumefactions of the head, trunk and extremities, they were found to be in various stages of inflammation. They were about the size of an olive, and some were white, hard, and in a state of crudity, presenting a singular granulated appearance, while others were found to be full of pus. In several instances, they were closely attached to the periosteum or perichondrium. The frontal sinus contained a jelly-like secretion, and a number of granules; and on the septum narium was an ulcer, exactly

like those seen in the nostrils of glandered horses, and upon it lay a cluster of granules; two or three very large white circular elevations were found, immediately below the saculi laryngis; Mr. Youatt, who was present, called them true glanderous chancres.

About an inch below the valve of the colon, for three inches in extent, over the whole of the surface of the mucous membrane were white granules, exactly like those in the other parts.\*

The first cases of chronic glanders or farcy in the human subject, were given in a letter from Professor Coleman, and published by Mr. Travers in his work on constitutional irritation; and these were so purely cases of farcy, that the Professor states, that “as far as his experience goes, the “nostrils of the human subject are not susceptible of glandered ulceration or inflammation.” The cases are as follows:

“Mr. Turner, a veterinary student, having slightly injured “his hand in examining the head of a horse which had “died of glanders—an ulcer ensued, with inflammation of “the absorbents, and of the cellular membrane of the arm, “and this was followed by symptomatic fever. After some “days, an abscess formed [in the opposite arm, and another “on the lower part of the back. Subsequently, he became “hectic, and suppuration took place in his lungs, and in one “of his kidneys, and after the expiration of several months, “an abscess formed, successively on each knee joint. A “short time after, he died.”†

Mr. Coleman inoculated an ass over the maxillary gland and at the margin of the nostrils, with the matter of the abscess in the arm, and likewise rubbed some upon the Schneiderian membrane. Glanders and farcy were the result, and the animal died on the twelfth day of the experiment. Precisely the same experiment was made on another ass, by the patient's brother, but no effect ensued, probably because the matter was not employed for several days, and had been left exposed to the air. He repeated, however, the experi-

\* Medico-Chirurg. Trans. vol. xviii. p. 201.

† Travers on Constitutional Irritation, p. 351.



ment upon the same animal with fresh matter, and it perished of glanders and farcy upon the fourteenth day.

In the following case, the disease began as farcy, and at length produced symptoms of the glanders.\*

“Nimrod Lambert, a healthy hackney-coachman, aged thirty-two, in January, 1822, infected a chap in the inside of the right thumb, by inserting it into the nostril of a glandered horse to pull off a scab. He remembered to have afterwards wiped the thumb with a wisp of hay. In the space of six hours, he was seized with violent pain and swelling of the thumb, it inflamed rapidly, upon which he applied a poultice to it, and took some salts. On the third day, he was suddenly taken ill, whilst driving, with cold shivers and giddiness, and states that he entirely lost the use of his limbs for seven hours. At this time, his arm pained him much all the way up, and on the following day, it was streaked with red lines and excessively swollen. The arm-pit was also much swollen and tender. In the evening of the fourth day, he was carried to Guy’s Hospital, where he lay during twenty-four weeks; superficial collections of matter formed successively in the course of the absorbents. The corresponding portions of the integument sloughed, leaving extensive ulcers which discharged an unhealthy foetid matter. The glands, at either angle of the lower jaw, and those of the groin, became swollen and he was much afflicted with pain between the eyes and down the nose, and exulcerations of the membrana narium, *attended with discharge*. During the progress of the local disease, he had much constitutional illness. He totally lost his appetite, and was oppressed with nausea, complained of severe pains with swimming in the head, and occasionally wandered in mind; he had also much pain throughout the whole course of the spine, especially in the region of the kidneys. His urine was thick and discoloured and foetid; his motions were slimy and purulent. Expecting to die, he quitted the hospital, and lay at home the remainder of the twelvemonth, in a state of great emacia-

“ tion from the continued discharge of his sores, his inability  
“ to take food and to procure any refreshing sleep, even with  
“ the assistance of opiates, which he took habitually. Des-  
“ pairing of aid from the profession, he applied to an expe-  
“ rienced female practitioner, who administered a decoction  
“ of herbs, which he invariably vomited, but to which he,  
“ nevertheless, ascribes his recovery. At the end of the  
“ twelvemonth, his health gradually returned, the arm began  
“ to heal, and he became comparatively hearty, and resumed  
“ his occupation, though with much inconvenience, owing to  
“ the distortion of his hand by the retraction of his thumb  
“ and forefinger in the cicatrization of a long line of abscesses  
“ reaching to the middle of the upper arm. After six weeks,  
“ this cicatrix ulcerated afresh, and healed slowly. He is  
“ still subject to wandering pains in the head, both sides of  
“ the neck, loins, and groins—is not so strong and fleshy as  
“ formerly, but has a good appetite. He has a great heavi-  
“ ness and disposition to sleep during the day, and at the end  
“ of two years and a half from the breaking out of the disease,  
“ considers his constitution broken, and despairs of ever being  
“ the man he was. An ass was inoculated by Mr. Sewell  
“ with the matter of this man’s sores, and died glandered.”

The two following cases are of great interest, and are an additional link in the chain of evidence, showing the high probability of the glanders being communicable from one human being to another. The first was a person of most intemperate habits, who drank large quantities of gin. One of his comrades stated he never knew one of his age to drink to such an extent. The other was the nurse who attended on him, and caught the disease in consequence.

“ John Smith, aged thirty, was admitted into Pitcairn’s  
“ ward, St. Bartholomew’s Hospital, January 23rd, 1840,  
“ with an indolent ulceration in the lower part of the left fore-  
“ arm, communicating with a fistulous passage, extending  
“ upwards, between the muscles, to a little above the elbow  
“ joint. From this sinus there was discharged a quantity of  
“ unhealthy looking pus, the man being evidently in a bad  
“ state of health.



“ States that he is a knacker by trade ; that about six  
“ months previous to his admission, he ran a splinter into his  
“ finger, of which, at the time, he took but little heed, but  
“ continued his usual avocations. On the day after the  
“ receipt of the injury, the finger began to be very painful  
“ and inflamed, the pain extending up the fore-arm and arm  
“ as high as the shoulder. In a few days, matter formed in  
“ the finger, and the flexor tendons sloughed. Soon after,  
“ another collection occurred in the palm of the hand, and  
“ subsequently to this, two other formations, one in the  
“ lower part of the fore-arm—the other at the lower and  
“ inner part of the arm, just above the elbow joint. After  
“ the lapse of a few days, his friends noticed he began to lose  
“ flesh and decline in health, but he still continued his em-  
“ ployment for nearly two months after the receipt of the  
“ injury. He became an out-door patient at the North Lon-  
“ don Hospital—had formations of matter in the finger,  
“ which were opened, but re-formed. Whenever the parts  
“ began to heal, he says he became much worse in health, and  
“ that the pains in the arm increased. On one occasion, the  
“ abscess in the finger healed, but a fresh formation of matter  
“ took place in the lower part of the fore-arm. About four  
“ months ago, was admitted into St. Bartholomew’s. The  
“ abscess in the finger and hand healed, but that in the fore-  
“ arm and above the elbow, remained open. He was nearly  
“ two months in the institution, when being in a bad state of  
“ health, and the abscess showing no disposition to heal, it  
“ was thought advisable to make him an out-door patient,  
“ which he continued to be for a short time, and was re-ad-  
“ mitted on the 23rd of January.

“ Under a generous diet, and sulphate of quinine, the  
“ wound began to heal, but on the 19th of February, the man  
“ complained of pain in the arm and shoulder, which by the  
“ 20th, had extended up the side of the neck. In the course  
“ of the day, he had a rigor, which lasted for a quarter of an  
“ hour or twenty minutes, and, subsequently, two other distinct  
“ attacks. On the following day, he complained of pain at  
“ the left angle of the lower jaw, in which situation the parts

“ were swollen and indurated. On the following day, he  
“ complained of pain in opening his mouth, and the swelling  
“ had extended over the angle of the jaw and up the side of  
“ the face, taking the direction of the parotid gland. The  
“ swelling was of a bright red shining appearance, indurated,  
“ and very painful on pressure. The inflammation continued  
“ to extend, the palpebræ became involved and swollen so as  
“ completely to close the left eye, from which a thick, puri-  
“ form discharge took place. The swelling and induration  
“ gradually extended forwards to the sides of the nose. The  
“ integument covering the swelling, assumed a livid appear-  
“ ance, and ulcerated at various points, which gave vent to  
“ small collections of matter, presenting very much the cha-  
“ racter of carbuncle. The lips became very much swollen,  
“ and tubercular elevations formed on them, which rapidly  
“ passed into a state of ulceration. The mucous membrane  
“ lining the left cheek, ulcerated, and portions of it sloughed,  
“ the disease extending backward to the posterior fauces.  
“ He gradually passed into a low typhoid state—the breath  
“ became remarkably foetid, and was stated by Mr. Charles  
“ Clarke, an experienced veterinary surgeon, who saw the  
“ man two days before death, to resemble very much that of  
“ a glandered horse. Mr. Clarke, also, immediately recog-  
“ nized the characters of the suppurative ulcers around the  
“ face and lips, as similar to the peculiar appearance of farcy  
“ buds in horses. The tongue, the entire cavity of the mouth,  
“ and the teeth, were covered with a dark black or brown  
“ sordes ; great difficulty of breathing came on, apparently  
“ from some obstruction at the orifice of the respiratory tube,  
“ the patient grew delirious, and expired on the following  
“ evening, being the 15th of the present month (March).

“ The patient, from the commencement of the affection to  
“ its fatal termination, had no discharge from the nostrils,  
“ did not complain, though repeatedly questioned on these  
“ points, of any pain in the joints or in the head; nor was  
“ there any affection of the absorbent glands, nor visible col-  
“ lections of matter in any of the external parts of the body  
“ remote from the disease, as in the groins, axillæ, etc.



“ The poor fellow seemed conscious that his arm was the  
“ source of the mischief, and during the course of the affection  
“ complained of pains shooting up and down the member ;—  
“ stated that he was in the habit of feeding glandered horses,  
“ and examining them after death, which he continued to do  
“ for some time, about two months, after the receipt of the  
“ wound in the finger—expressed his firm conviction that  
“ he was labouring under that malady which he said would  
“ do for him at last.

“ On a post mortem examination, the left parotid and sub-  
“ maxillary glands were found indurated and adherent to the  
“ lower jaw, their substance was thickly studded with nume-  
“ rous small collections of pus, varying in size from a pin’s  
“ head to a split pea, and around these collections, the sub-  
“ stance of the gland was highly vascular, and presented a  
“ bright red appearance ; of the two glands, the parotid was  
“ the most affected. The alæ nasi were livid, and had al-  
“ most passed into a gangrenous state. Numerous tuber-  
“ cular elevations, which could hardly be said to have passed  
“ into a state of ulceration, were seen on the mucous mem-  
“ brane of the nares. The mucous membrane lining the  
“ larynx and trachea were much injected, and an ulcer was  
“ seen on it just below the rima glottidis. Several small  
“ tubercles were seen at the apices of both lungs, which Mr.  
“ C. Clarke stated were precisely similar to those occurring in  
“ the lungs of horses who had died of farcy or glanders—cer-  
“ tainly they were different from the ordinary tubercles found  
“ in phthisical subjects. The spleen was enlarged to three or  
“ four times its natural size, probably the effects of former  
“ disease, but in its substance, there were found several small  
“ collections of pus. There was also a puriform deposit  
“ within, and in the course of the splenic vein, especially  
“ where it emerges from the substance of that organ.

“ The nurse, Jane Love, aged forty-two, who attended upon  
“ John Smith, on the third or fourth day after his decease,  
“ perceived a small tumour, near the left axilla which  
“ was painful, the pain extending down the inner side of the  
“ arm. She, however, took so little notice of this, as not to

“ mention the circumstance. On Saturday evening, March  
“ 21st, being the sixth after the man’s decease, the pain in  
“ the arm increased, and an inflammatory blush appeared on  
“ it ; this, however, she considered to be nothing more than a  
“ slight attack of erysipelas, which continued, however, to  
“ extend, and on Sunday morning presented the following  
“ appearances. The anterior, posterior and inner aspects of  
“ the arm, from the axilla down to the elbow, appeared to be  
“ the seat of an extreme phlegmonous inflammation, of a  
“ brick-red or dusky hue, and limited by a well defined and  
“ elevated border. The swelling was indurated, very tender  
“ on pressure, and on its surface could be seen several small  
“ elevations ; a livid patch, about the size of a shilling, in the  
“ neighbourhood of the axilla, and close to this, a large, irre-  
“ gularly shaped vesicle, containing a yellow viscid substance  
“ at the bottom, and a clear limpid fluid floating above. The  
“ woman, who was of a plethoric habit of body, had an  
“ anxious countenance, a rapid pulse, dry and furred tongue  
“ which was red at the tip and edges, and accelerated breath-  
“ ing, complained of great thirst and a dull aching pain over  
“ the situation of the eyebrows, states that she had had several  
“ attacks of chills and heat, alternating with each other, and  
“ had scarcely a wink of sleep the two preceding nights.  
“ Thirty leeches were applied to the arm, which gave almost  
“ immediate relief ; the member was then enveloped in a lin-  
“ seed-meal poultice, and the usual antiphlogistic measures  
“ enjoined.

“ On the next day, expressed herself much better, the arm  
“ less painful, tongue moist and cleaner. Two incisions were  
“ made in the arm ; the subjacent tissue was hard and  
“ brawney, no pus flowed from the wounds, merely blood,  
“ mixed with a small quantity of serum. On the following  
“ day, no discharge from the wounds, the parts showed no  
“ inclination to take a healthy action, but the inflammatory  
“ redness had crept down the elbow to the fore-arm. The  
“ tongue was dry, brown and chapped—pulse rapid and de-  
“ ficient in power—countenance anxious. As it was now  
“ considered necessary to support the system, she was or-



“ dered strong beef-tea, and sesquicarbonate of ammonia in  
“ five grain doses. This, for a time, had the desired effect,  
“ the patient expressing herself as better, the pulse becoming  
“ less rapid with more power, and the tongue in a better con-  
“ dition. This state, however, did not continue; no suppu-  
“ ration had yet taken place from the incisions, there was no  
“ tendency in the parts to take a healthy action, an erythe-  
“ matous blush appeared on the upper part of the chest and  
“ about the neck, several red and purple spots, about the  
“ size of a split pea, were seen on the left mammæ, and be-  
“ tween it and the shoulder. The patient complained of  
“ great thirst and was constantly calling for drink. The  
“ inflammatory process gradually extended down the fore-  
“ arm to the wrist, and upwards over the shoulder, involving  
“ the side of the neck and upper part of the back, and ex-  
“ tending as far round as the shoulder of the opposite side.  
“ She gradually passed into a typhoid state—refused all  
“ nourishment, except a little wine and water, grew weaker  
“ and weaker, difficulty of breathing came on, and she sank  
“ on the morning of the 30th instant.

“ The functions of the sensorium were affected—early in the  
“ course of the disease, a low, muttering delirium being  
“ present. There was also great dread on the part of the  
“ woman of having taken the infection from the man upon  
“ whom she had been attending.

“ On the post mortem examination, the infected arm was  
“ infiltrated with pus, purulent deposits were also seen be-  
“ tween the muscles, taking the course of the vessels and  
“ extending up to the side of the neck and front of the chest,  
“ but the veins were free from deposits, and appeared  
“ healthy; numerous small collections of pus were seen in  
“ the texture of the muscles on the anterior part of the  
“ thorax; the integuments of the fore-arm were livid, and  
“ the subcutaneous and adipose tissues infiltrated with a sero-  
“ purulent fluid. The mucous membrane lining the larynx,  
“ trachea and bronchi was highly injected.”

It is to be regretted that no ass or horse was inoculated with matter taken from these patients, but Mr. Brush inocu-

lated three kittens with matter taken from this woman's arm, two whilst she was living, and one after her death. The kittens, however, appeared to have nothing the matter with them till the punctures were nearly healed, when they were affected in an extraordinary manner, losing the use of their limbs and appearing to labour under the influence of some poison absorbed into the system; one of the kittens had, also, a yellow discharge from the eyes; the mother, also, appeared to be affected, and lay snuffling and sneezing, and refused all nourishment for three days. The animals being now considered unsafe, were destroyed.\* Breschet, it is said, has also observed a similar case of the communication of glanders from one human subject to another in France.

*Prognosis.*—Of fifteen cases of acute glanders, collected by Rayer, only one recovered. Of fifteen cases of acute farcy, only five recovered. Of seven cases of chronic farcy, only one died. Of three cases of chronic glanders, two died. The only favourable prognosis, consequently, is in chronic farcy.

*Diagnosis.*—“Acute glanders cannot,” says Rayer, “be confounded with poisoning from punctures in dissecting or opening dead bodies; for,” he adds, “out of fifty such cases, reported by various authors, no mention is made in any of them of a discharge from the nostrils, or of a nasal or laryngeal eruption being found after death, or of the peculiar cutaneous eruption.” Leblanc also states that he has inoculated the horse with a great number of other morbid secretions from the human subject, but has in no instance produced any disease similar to the glanders. It may, for a short time, be mistaken for acute rheumatism, but the occurrence of the secondary actions of the poison speedily dispels this error. It is impossible, perhaps, to enumerate every difficulty that may occur in the diagnosis; but when any doubt exists, an inquiry into the habits and employment of the party, will probably solve the problem, or the inoculation of a healthy animal, is an excellent counter proof.

\* These cases occurred under Mr. Stanley. Med. Gaz. 1839-40, p. 105 and 183.



*Treatment.*—All the remedies hitherto tried in acute glanders have failed, for only one out of fifteen has recovered, and that not from any particular treatment. Blood, when taken at the commencement, has been found buffed, and some momentary relief has been afforded, but the bleeding ought not to be repeated, as in the more advanced stages, the prostration is great, and stupor quickly follows, and leech bites have become gangrenous. The coming on of typhoid symptoms has caused quina, valerian, serpentaria, ammonia and other stimulating medicines to be exhibited, but all these experiments have failed; vomiting and purging have been likewise had recourse to, but these measures have been equally unsuccessful. In the present state of our knowledge of this disease, every experiment in treatment is warranted as the only chance of subduing a malady which has so constantly proved fatal. In the more chronic forms of the disease, the recovery of the patient has appeared rather to be owing to the excellence of his constitution, than to any powerful effect produced either by general or local treatment.\*

*Preventative treatment.*—The prophylactic treatment is the same as that of all other contagious diseases, or carefully to avoid all contact with the morbid poison, and especially when a finger or other part of the hand is abraded; and

\* A case of chronic glanders, in a man who had the care of a glandered horse, was admitted into St. Thomas's Hospital a short time ago. The poison had been absorbed by a wound in the finger, and the extremity of the finger was greatly swollen, ulcerated, and discharged pus, having a most offensive odour, and several lymphatic glands along the fore-arm and above the elbow were enlarged and indurated. The general health of this man was greatly impaired, and his spirits dejected, but the most remarkable feature in the case was, that in a few days, he lost the use of the lower extremities so entirely, as to be completely paraplegic. The finger was directed to be dressed with the unguentum hydrargyri nitrico-oxydi, while magnesiæ sulphatis 3j, out of camphor mixture, was ordered to be taken three times a-day. The finger healed kindly, and the paraplegia was removed, and the general health of the party restored; but the glands above the elbow continued indolent and enlarged. He remained in the house till he considered his health perfectly restored, when he left it to return to his business.

if by accident the veterinary surgeon should accidentally inoculate himself, he ought instantaneously to have recourse to lunar caustic. It has been recommended, after the disease is set up, to extirpate the enlarged glands; but if there is any truth in the doctrine, that the blood is poisoned in this disease, and that the local affections are the secondary actions of the poison, this practice must be as unwarranted as hopeless.

With respect to the horse, it is usual to sell or rather destroy the glandered animal. "But," says Mr. Youatt, "will this be sufficient? No, far from it; for sound horses, " weeks and months afterwards, being put into a stable " whence a glandered one had been taken, have speedily " become glandered. Some of the discharge from the nose " has remained about the manger, rack, or partition, which, " although dried up, may be readily softened by the breath " of the new horse, or introduced into the system in the act " of nibbling or by licking. Let then," says Mr. Youatt, " the halters and head-gear and bridles be burned, and the " clothes washed and baked, and the pails be newly painted, " and the racks and manger thoroughly scraped, and then " washed well with soap and water, and afterwards well " washed with chloride of lime and water, in the proportion " of a pint of the strong solution to a pail of water, and let " the walls be well scraped and washed with the chloride of " lime and water, and then well lime-washed, and the floor " be first thoroughly scoured, and then sluiced with the " chloride, and every possibility of danger will be removed."





## P O R R I G O

Is a contagious disease, the poison producing an eruption of psudracious pustules, principally on the scalp. The duration of this affection is from a few weeks to a few months.





## OF THE POISON OF PORRIGO.

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PORRIGO is a generic term for an eruption of psudracious pustules, usually termed scald-head. This disease is contagious, and has its especial seat on the scalp, but may extend over other parts of the body. The Greeks were, probably, acquainted with this affection, but their classification was so imperfect, that we are not enabled to determine the name by which they designated it. Dr. Willan adopted the term porrigo in consequence of the classical authority of Celsus, who has included many different diseases under this appellation. It is now intended to restrict the term porrigo to those forms of psudracious eruptions which are contagious, and which, as far as can be traced, result from the action of the same poison.

*Remote causes.*—The origin of this poison, and the time of its first appearing, are equally unknown. Some pathologists conceive it, in all instances, to be generated spontaneously when favoured by certain predisposing causes. It must be admitted, however, supposing this hypothesis to be true, that the predisposing causes constantly exist without the poison in question being formed.

*Predisposing causes.*—The predisposing causes which facilitate the action of this poison, are age, improper diet, feeble health and squalid poverty.

The effects of *age* are very marked in this disease, porrigo being seldom seen except in children and early adult age. The porrigo favosa and the porrigo scutulata, have been met with as early as the second or third day after birth, when the mother has been labouring under one of those diseases, but the most common period is the seventh or eighth year. All



forms of the disease, indeed, are much less frequent after puberty, and with some rare exceptions, are almost unknown in persons that are bald, or greatly advanced in life. Mahon, however, says that he has seen two or three septuagenarian women who had contracted the disease.

The *sexes*, perhaps, are equally liable, but girls, from wearing their hair long, appear to be more often affected than boys.

A feeble state of the *constitution*, or weak health, appears to favour the action of the poison. Thus children affected with otitis, ophthalmia, or disease of the cervical glands, are generally supposed to suffer most frequently from porrigo, and when the state of health is decidedly bad, the eruption often becomes inveterate, so that deep-seated ulcers form, penetrating the pericranium, and exposing even the bones of the skull. Mahon conceives that any previous affection of the scalp, as an excoriation, a debilitated state of the orifices of the crypts, greatly favour the attack. If the patient should be exposed to the contagion of porrigo favosa while labouring under any other form of the disease, the former generally supersedes it, for the affection contracted under these circumstances, is usually so virulent that the pustules become confluent, and thus it reigns alone.

The *social position* of the patient greatly influences the predisposition to porrigo. The poor living in large cities, in low, crowded, ill-ventilated rooms and in narrow streets, are the most often affected. In Paris, the cases principally come from the Faubourg St. Antoine, St. Marceau, de la Cité, or from la Halle, the lowest quarters of that capital, and in which the most indigent part of the population reside. The moral and physical miseries incident to a prison, are supposed to predispose to this affection, at least Biet is of this opinion, and he gives the case of a man incarcerated many years in a low damp dungeon, and at the same time deprived of the necessaries of life, who was affected with this disease. Indeed, all writers are agreed that porrigo is the sad apanage of the indigent rather than of the rich, and more especially prevails in those families in which cleanliness, especially of

the head, is neglected, and whose diet is insufficient or unwholesome. The occurrence of porrigo has been supposed to be influenced by climate, for it has been observed to be more frequent in the south than in the north of France, and although it rarely affects the agricultural labourer, yet when it does occur in that class of persons, it more frequently attacks those resident in low and marshy districts, than those of the higher and healthier country.

*Contagious.*—Bateman defines porrigo to be a contagious disease. “Porrigo scutulata,” he says,\* “seems to originate spontaneously in children of feeble flabby habit, or in a state approaching to marasmus, who are ill-fed, uncleanly and not sufficiently exercised, but it is principally propagated by contagion, that is by the actual conveyance of the matter from the diseased to the healthy—by the frequent contact of the heads of children, but more generally by the use of the same combs, caps and hats—whence the multiplication of boarding-schools appears to give rise to an increased prevalence of this disease among the more cleanly classes of the community at the present time. For such is the anxiety of parents to regain the lost years of education, that they too often send their children to these schools when capable of communicating the infection, although supposed to be cured—against which no vigilance on the part of the superintendants can afford a sufficient security.” Again,† as to porrigo favosa, he says—“Neither are children the only subjects of their attacks, although the most frequent, for occasionally adults receive the contagion in those parts, which come most frequently in contact with the diseased parts of their children, as in the face, about the mouth from kissing them, or in the mammæ from suckling, or on the arm on which they are held, when a single pustule or cluster of pustules forms, and gradually disappears without any remedy.”

Rayer, also,‡ says, the term favosa has been used to delineate a chronic affection of the skin, *essentially contagious*

\* On cutaneous diseases, p. 167.

† Ree's Cyclopedia, Art. Porrigo.

‡ P. 510.



in its nature, and he gives the following example in support of this opinion :

“A woman who was in the daily habit of carrying about one of her children affected with favosa, was by and by attacked on the fore-arm that supported the head of the child, with a small cluster of favi, the yellow, dry and cupped incrustations of which were properly characteristic.” This woman and her child had been sent to him by Messrs. Olivier (d’Angers) and Bricheteau, who had satisfied themselves that no pustules or crusts of favosa had existed in any part of her body previously to the affection of her child ; and several other instances are published in the *Journal Hebdomadaire*.\*

Dr. Willis,† also, states, that the pustular forms of trichosis favosa, of trichosis lupinosa, as well as of the trichosis simplex or ring-worm, are contagious diseases ; and he thinks these varieties are not only frequently to be traced from individual to individual, but also have the power of *engendering one another*. “I have,” says this physician, “seen the trichosis lupinosa arise on the shoulder and arm of a girl fifteen or sixteen years of age, who was in the habit of nursing her sister, a child of seven or eight, affected with trichosis simplex of the scalp.” Mahon, Biet and almost all writers agree that certain forms of porrigo are contagious, although they are not entirely agreed as to the number of the species.

The fact of the contagious nature of porrigo is not doubtful, but it does not appear to be eminently so, for much difficulty has been found in communicating the disease by a direct application of the matter secreted. Some practitioners, for example, having observed that serious disease, in a few instances, has followed the subsidence of porrigo, have endeavoured to reproduce it, and generally with a very partial success. Alibert‡ states he has tried to communicate the

\* Tom. iv, p. 72.

† Illustrations of Cutaneous Diseases ; a series of delineations of the affections of the skin in their more interesting and frequent forms, by Dr. Robt. Willis, fol. London, 1840.

‡ P. 16.

disease in cases, where its suppression had been followed by disease, but only succeeded in one instance, and that with the porrigo favosa. M. L'Homme\* imagined that a case of chronic enteritis which he was treating, might be benefited by counter-irritation, and he inoculated the little patient with the ichorous matter of the 'porrigo muqueuse' in six places in the forehead, and enveloped his head every evening with linen impregnated with the same secretion. Ten days after, the face and forehead were covered with crusts. Another practitioner, also, for a similar purpose, communicated the disease to a child six years and a half old, by the reiterated application of poultices so impregnated with porrigo virus, as to smell like the urine of a cat. Gallot, also, produced the disease in a similar manner by poultices.†

Mahon, also says, that the contagious nature of porrigo is confirmed by many instances, and he contends that the means which have in general been taken to communicate the disease have been improper. Some inoculate ichorous putrid matter which flows under the crust, but it does not contain the porriginous poison, while others, applying a cataplasm from a diseased head, have failed, because Thenard has shown that only one sixth of the porriginous secretions are soluble in water. Mahon recommends as the best method of producing porrigo, that the matter be taken at the moment of the rupture of the pustules, then dried at a high temperature and reduced into powder. It is now to be rubbed several times on the skin wiped dry, so as to free it from all perspiration, and this experiment, he says, seldom fails.

Luxmore states, “ that the disease consists of a chronic inflammation, productive of a matter peculiar in its nature, and capable of propagating the complaint, if applied to the scalp of a healthy subject, as much as syphilis or any other specific disease. If applied to other parts of the body, it produces a similar disease, allowing for difference of structure of those parts, and which is generally known under the name of ring-worm.”

\* Alibert, p. 15.

† Rech. sur les Teignes, 8vo. Paris, 1805.



Mr. Plumbe says,\* “as to its mode of extension by contagion, still less hesitation must be felt in acknowledging its complete independence of constitutional causes, as it runs in a short space of time through whole schools, alike affecting those of the most robust and decidedly healthy habits, with those of an opposite condition.”

The crusts have been analysed, in order to determine, at least, their chemical qualities, and Thenard, who was employed by M. Gallot, found they were composed of coagulated albumen, seventy parts; of platina, seventeen parts; and of phosphate of lime, five parts, together with eight parts of water and of loss in every one hundred parts. Taking the crust, however, altogether, only one-sixth part was soluble in water. At Alibert's request, Vauquelin again analyzed the crusts of porrigo favosa, and the results obtained, were, that the favus crusts were composed of more albumen than of gelatine, also, that the furfuraceous crusts gave more gelatine than albumen, while the granulated crusts were composed entirely of gelatine. Thus demonstrating a specific difference in the crusts of the different species established in nosology.

*Fomites.*—It is generally believed that the spread of porrigo is caused principally by fomites. “I have remarked,” says Mahon, “children who wore woollen caps to be attacked in large numbers. At the Hôpital de l'Enfant Jesus, all the children admitted, are placed in the same room, those that labour under porrigo, as well as those who do not, and that the latter seldom fail catching it, and,” he adds, “I have a great number of similar facts, so that I entertain no doubt of its contagious nature.” “Favosa,” says Rayer,† “is readily communicated among children, who make use of the same comb or brush, especially if a slight abrasion exists.” Willan says, “he has seen one child in a school communicate the porrigo scutulata to fifty others in the course of a month, and he condemns, with great reason, the filthy practice so often pursued in establishments for the education of youth, of using the same comb for the whole of the children.”

*Pathology.*—The theory of this disease is, that the poison

\* P. 52

† P. 518.

is absorbed and infects the blood, and after a given period of latency produces a pustular eruption of a given character on the part of the scalp to which it is applied, and subsequently, perhaps, of the whole scalp. A similar eruption sometimes appears on other parts of the body to which the poison may have been immediately applied, but not otherwise. The proof of the blood being infected in this disease, is, that there are cases in which the head has been shaved and carefully washed for many months, and each favus destroyed by lunar caustic as soon as it appeared, yet the whole scalp has ultimately been covered by them, and as far as could be judged, without any direct application of the poison.

Pathologists are not agreed as to the number of species of porrigo. Sauvages enumerates nine species; Willan, after the Arabians, six species; Alibert, five species; and Rayer, two species. It will, perhaps, be nearer the truth, to limit them to four or to the porrigo favosa—the porrigo lupinosa—the porrigo furfurans—and the porrigo scutulata. The species are distinguished by the different magnitudes of the pustules, the larger being termed, favi, and the smaller ones, aches; also by some differences in their forms, or in their crusts or scabs. The frequency with which these different forms occur, appears greatly to vary in different years. Alibert says, of the cases he treated at the Hôpital St. Louis, ninety cases in one hundred were favus.

The *porrigo favosa* is an eruption of the larger pustules or favi. The more recent writers have described four stages of this complaint, or a stage of vari—of pustule—of encrustation and of ulceration.\*

A slight pruritus announces the invasion of this disease and after a few hours' duration, a number of small red vari, sensible to the touch and to the sight, appear. These augment in size, and before twelve hours have passed, a yellowish point forms on each of their apices, at first so small as to be only visible under the microscope, but which rapidly increases, so that at the end of twenty-four hours, they are as big as a millet seed. They continue gradually to increase, and about

\* Willis and Mahon.



the fifth or sixth day are as large as a lentil. Such is the general course of the favi, but sometimes it is slower and the inflammation so little sensible, that it is often fifteen or twenty days attaining the size it usually acquires in one.

This pustule never acquires much elevation above the surface of the skin, and, according to some authors, its form is well defined and globular, while others,\* state it to be irregular. It is slightly depressed or umbilicated in the centre. The peculiar matter which fills the pustule scarcely remains fluid for twelve hours after its formation, but concretes into a dry, brittle, candied-honey looking scab or crust, which retains the form of the pustule, is similarly cupped or depressed in the centre, and is covered with the epidermis.

The form of the scab then is more or less circular, and on its under surface is a small mammary process which corresponds to the depression in the skin. Its upper surface gives the peculiar character of the disease, and the cup shape assumed by the crusts of the favi have caused them to be compared to the cells of the honey-comb. The central depression of the crusts is not the effect of accident, but is supposed to be caused by the umbilicated form of the pustule binding down the epidermis by which it is covered. The crust continues to increase, still preserving its circular form and depressed centre, till it occasionally attains a magnitude of five or six lines in diameter. When the crust is recent, it is of a yellow or fawn colour, but as it grows older, its hue becomes lighter, and the crust easily reduced to a powder, resembles pulverized sulphur.

The number of the favi is generally considerable, and they commonly appear in crops, affecting different parts of the head at distant intervals. They may be either distinct or confluent. When they are very numerous or confluent, the scabs of the favus, by their aggregation, are of considerable magnitude, but the cupped form of the individual crusts may frequently be recognised on the surface, and according to Rayer,† should this peculiar shape be lost through the copiousness of the secretion, still by carefully removing the superficial layers, each particular favus with its central depression may be distinctly made out. The smell of the scabs

\* Bateman and Rayer.

† P. 561.

or incrustations is singularly offensive, like the urine of a cat, or of a cage in which mice have been kept. When softened by cataplasms, the odour is faint and sickly, like bones that have been boiled with their ligaments.

When a crust of recent formation is removed, a circular depression, wider and of less depth than the favus is seen, and this increases in depth as the crust grows older. When the encrustations are agglomerated, the skin presents a number of small lenticular depressions, separated by linear elevations. These depressions are red and denuded of the epidermis, but not ulcerated even in those situations where the crust appears buried in the skin. In each of these depressions, a minute, red, central point is perceived, which is often traversed by a hair. The skin occasionally preserves its healthy characters between the favi, but when the groups are numerous or much crowded, it frequently presents a morbid redness, and undergoes repeated furfuraceous desquamation. In the majority of cases, and when the disease is properly treated, the depressions in the skin disappear, and the epidermis is renewed, but the situations occupied by them, however, are still indicated by the presence of small violet coloured spots, which, at length, disappear.

The pustule thus described is deeply seated in the dermoid tissue, for Alibert was never able to remove one for the purpose of making a preparation, as may be done with some other similar formations, without deeply wounding the scalp, and producing a considerable hæmorrhage.

If the disease proceeds and the crusts be removed, the rete mucosum is found red and erythematous. The epidermis has disappeared, and numerous small ulcers are seen discharging a yellowish, viscid, fœtid fluid, which concretes and sometimes so extensively, as to form one entire encrustation over the whole head, and with here and there a pustule not yet broken. In this stage, the scalp sometimes chaps or cracks, and there flows from the crevices, a matter sometimes ichorous, sometimes purulent, and which inflames the skin. In some cases, however, an abscess or a deep and extensive



“ watched the patches of trichosis simplex from their appearance to their conclusion many times, without seeing a vestige of a pustule of any kind.” Plumbe, also, affirms that the straw coloured pustules termed *achores*, do not appear necessary to constitute the disease, as they are not seen till later, and after some degree of itching and irritation of the part has been felt.

After an uncertain time, the second stage commences by an eruption of the smaller pustules or *achores*; not prominent and generally traversed by a hair. These small yellow points, much more numerous at the circumference than in the centre of the circular patches, are soon succeeded by scabs which unite in such a manner as to form incrustations of a breadth corresponding to the eruption. These are generally circular in their shape, while dry and brittle portions detached from time to time resemble the crumbling of mortar from an old wall.

If the pustules be left to themselves, not only do the areas of the primary groups extend, but new ones are formed; and when these groups are in apposition, their edges blend together, forming extensive and irregular patches. The circular character of the primary clusters, however, is still indicated by portions of the arcs of a circle, distinguishable at the circumference of the larger incrustations.\* If the progress of the disease be still unimpeded, the patches may so extend, that, at length, there remains uninjured only a narrow border of the hair round the head.

When the scabs are removed, the surface of the patch is red and shining, but studded with slight elevated points or papulæ, in some of which minute globules of pus may appear again in a few days.

Bateman mentions the pustular stage passing into ulceration, and Mr. Plumbe says, that “extensive ulceration of the scalp has been produced by mis-management.†”

The *porrigo furfurans* is the last form of this disease, and

\* A Theoretical and Practical Treatise on the Diseases of the Skin, by P. Rayer, translated by Robt. Willis, M.D. 1 vol. 8vo. and atlas, 4to. London, 1835, p. 514.

† P. 59.

commences\* with an eruption of small *achores*. The discharge from the pustules is small in quantity, and the ex-coriation slight; the humour, therefore, soon concretes and separates into innumerable thin laminated scabs or scab-like exfoliations. At irregular periods, the pustules re-appear, and the discharge being removed, the eruption becomes moist, but soon dries up and exfoliates. This form is attended with a good deal of itching and some soreness of the portion of the scalp to which the disease is confined, and the hair which partially falls off becomes thin, less strong in its texture and sometimes lighter in colour. Occasionally the glands of the neck are swelled and painful.

Such is the pathology of porrigo as at present known; but nothing can shew the necessity of re-studying this disease more than the great discrepancy which exists among authors upon many important points, as the nature of the pustules, the number of their stages, their form, their magnitude and their seat. Most writers define the favus to be a pustule and to secrete pus. "These buttons," says Alibert, "contain pus." "Attentive observation, often repeated, do not allow me," says Mahon, "to entertain this opinion," and he considers the secretion to be a fluid 'sui generis.' There is an equal disagreement as to the number of stages of the favus pustule. Bateman and Alibert mention only three stages, or, the pustular, the scabbing and the ulcerative stages, while Willis and Mahon assert there are four, the first stage being marked by an eruption of vari, or little red points sensible to the finger; and a similar disagreement exists also, as to the number of stages of the pustule of the porrigo scutulata. The form, also, is a subject of dispute, for Bateman describes them as not in general globular with a regular circumscribed margin, but as somewhat flattened, with an irregular edge, surrounded by a slight inflammation. Mahon says their form is semi-spherical, the flattened side being next to the orifice of the follicle. Willis conceives his plate to be the only correct delineation of the disease, and he depicts them as

\* Bateman, p. 162.



globular, with an inflamed areola, while Alibert gives no description whatever of their form. As to their size, some writers describe them as big as a split pea; Mahon as big as a millet seed; while Alibert calls them “très petits boutons pustuleux.” Their seat, however, has caused the greatest difference of opinion, for some consider it as an affection of the sebaceous follicles—others, as an affection of the hair bulbs; Alibert places it deep in the rete mucosum, while others, again, affirm that it is seated in the dermis generally.

*Symptoms.*—There are few other local symptoms than itching, and this is often greatly aggravated by pediculi, which, in children, whose heads are neglected, nestle in large numbers under the scabs. This symptom is often so troublesome, that Mahon says he has known the affected party to scratch their heads not only with their nails, but with knives, forks or other instruments, and sometimes to strike their heads with their fists. The constitution is seldom in any degree affected, but it has been observed that many persons whose intellectual faculties are extremely limited, and others, also, who seem stricken with premature old age, are often affected with porrigo, so that it has been inferred that this class of unfortunate persons is peculiarly liable to the disease. This, however, appears to be an error, for their liability proceeds less from any peculiar predisposition than from the neglect with which they are in general treated. A very remarkable case of this description occurred some years ago at St. Bartholomew's Hospital, in which the disease had been allowed to proceed to such an extent, that the incrustation, when removed, was a complete cast of the head. The individual, in this case, was a male, exceedingly feeble in character, and had one mamma as perfectly developed as in the female, as to form, colour, softness and delicacy of structure—he was about thirty years of age.

*Diagnosis.*—It is impossible, till the pathological phenomena are better determined, to give any satisfactory diagnosis between these and those other diseases that resemble them.

*Prognosis.*—The prognosis is, in all cases, highly favourable.

*Treatment.*—The treatment of the different forms of porrigo is, perhaps, as little determined as their pathology. Some practitioners rely entirely on a constitutional treatment, as on small doses of rhubarb and soda, small doses of mercury, some mild preparation of iron, or else on vegetable tonics ; as the infusion of cascarilla, or the compound infusion of gentian. Others, again, as entirely rely on a local treatment, first attempting to exterminate the disease by cauterization, and should that fail, by treating it empirically by some favourite ointment, and the catalogue of ointments used for this purpose, includes all that have, at any time, been admitted into the pharmacopæia. The principal of these have been the unguentum zinci, an ointment of the coculus indicus, in the proportion of two drachms of the berry to an ounce of lard, or one of equal parts of sulphur and soft soap, also the ung. hydrargyri, unguentum hydrargyri nitratis, the unguentum hydrargyri nitrico-oxydi—an ointment of calomel or of acetate of lead, of opium, of hellebore, of turpentine, of mustard, of stavesacre, of black pepper, of capsicum, of galls, of rue and an infinity of others might likewise be mentioned. The lotions, also, which have been used are equally numerous—as the mineral acids, a solution of potash, of the sulphates of zinc and of copper, of the oxymuriate of mercury and of the argenti nitratis, besides the application of the Træ ferri and blisters. All these remedies were used and recommended by Willan, Alibert and Bateman, accompanied with directions extremely difficult to understand, namely, that they should be employed according to the stage of the disease, while depilation or the extraction of the hair is recommended by almost every writer.

The London Hospitals do not, in general, admit cases of porrigo into their wards, yet in the course of a year, the number received is, notwithstanding, considerable ; and the practice adopted by Drs. Roberts, Powell and Haworth, while I was a student at St. Bartholomew's Hospital, in every case of porrigo, whatever the stage or form of the disease, was as follows :

They first directed the head to be poulticed till all the



scabs were removed, and this being effected, they shaved the head, and applied the unguentum picis liquidæ over the whole scalp, which they directed should be washed off night and morning with soft soap and water, and the ointment to be repeated. The patient was also to wear an oil skin cap, and his head to be shaved twice a week. This treatment was so universally successful in their hands, that I have adopted it during the twenty years I have been attached to St. Thomas's Hospital, and I do not remember one instance in which it has failed. Indeed, the only improvement I have been able to make on it, has been in cases in which the favi are still unbroken, or the incrustation but trifling, to wash the whole scalp night and morning with the oleum terebinthinæ purificatum, by means of a common shaving brush, taking care to prevent its running into the eyes. The duration of the disease under this treatment has been from a month to six weeks.

Porrigo scutulata is not by any means so frequently seen in hospitals as porrigo favosa, and its treatment is not determined; but the directions given by Dr. Willis,\* are, probably, the best we possess. “Trichosis simplex is a disease “that naturally tends to a cure, but this unhappily occurs at “an indefinite period, and the disease may exist for months, “or even years before it arrives. The affection is most rebellious to every form of treatment that has yet been employed against it—any medication succeeds at the favourable moment—none appears to influence the disease when “used inopportunately. There is no specific for the disease, “unless, perhaps, it be the removal of the hair by the roots. “In the earlier stages, tepid fomentations for an hour or “more at a time, and repeated once, twice or thrice in the “course of the day, and the application of a light bread and “water poultice during the night, will often be found to “dispose the patches favourably, and to induce such a change “in the actions of the hair-bulbs, that they begin to secrete “healthy hairs after the diseased stubs have been removed.

\* Illustrations of Cutaneous Diseases.

“I have even seen the disease yield to no more active treatment. The lunar caustic applied in a ring round the patches, at the distance of about a line from their outer margin, has, also, occasionally a very remarkable effect in modifying the morbid action that is going on within them. Applied directly to the parts affected, however, this and all other irritating and stimulating washes and salves, do mischief in the earlier part of the disease. By and by they become as useful, as in the first instance they were prejudicial. A solution of sulphate of copper (gr. vii—x to the ounce of water) of nitrate of silver (in the same proportion)—the mild ointment of the nitrate of mercury—a salve of the black sulphuret of the same metal (sulphuret hydrarg. nigr. 3j to 3jj adepis 3j) the unguentum picis—an unguent of the cocculus indicus pulveriz. 3j to 3jj adepis 3j may be tried one after the other, and in different instances, each will have the merit of the cure. Time and perseverance are the sovereign remedies, combined with which every one succeeds; without which, all in their turn will fail. The most efficacious remedy in itself is, undoubtedly, the eradication of the affected hairs. These are to be removed singly with the forceps, not pulled out along with all the healthy growth in their neighbourhood, as used formerly to be done by the barbarous application of the pitch-cap.

“The disease occurring on surfaces, not particularly covered with hair, yields at once to the application of a solution of sulphate of copper or nitrate of silver in water.”





## PALUDAL DISEASES.

The paludal poison produces intermittent, remittent and yellow fevers, which are distinguished from most others by a periodic interval of apyrexia. The duration of these forms of disease is from a few hours to many days, weeks, or even months. The yellow fever, however, usually terminates in a few days. The paludal poison also produces dysentery. It will be more convenient to separate these affections, and to treat first of paludal fevers.





## OF THE PALUDAL POISON.

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HIPPOCRATES uniformly connects fevers, enlarged spleens, diseased livers and dropsy, with low and marshy districts. This physician, therefore, was unquestionably acquainted with intermittent and remittent fevers, with dysentery, and, perhaps, also with sporadic cases of yellow fever. The yellow fever, however, being, for the most part, epidemic only between the tropics, we possess no earlier history of that form of paludal disease than that of Joam Ferreyra da Rosa, published at Lisbon in 1694, and entitled “*Trattado da Constituicam Pestilencial de Pernambuco* ;” a work which contains an account of the epidemic yellow fever, which prevailed at Olinda in Brazil, between 1687 and 1694, or shortly after the Portuguese had made the conquest of Pernambuco. It may appear remarkable that so formidable a disease did not attract the attention of Europe till a century after the discovery of America ; but its equinoxial regions were, in the first instance, principally visited and colonized by the Spaniards and Portuguese, who rarely settled at that time in any numbers on the coast, but rather attempted to penetrate into the interior, urged by the ambition of boundless conquest, and by the hope of suddenly enriching themselves with the vast treasures which they were aware lay buried in the more central and mountainous portions of the new continent.

The facts relating to paludal disease and their cause which were known to Hippocrates, were likewise known to Galen, and even the architects of the middle ages, Paladius and Vitruvius, make distinct mention of the insalubrity of marshy countries. It is extraordinary, however, that a doctrine so important



should have sunk into such oblivion as to have been altogether unknown to Sydenham. The Italians appear, also, to have been equally unacquainted with it, until the time of Lancisi, who has the great merit of having again noticed and revived the subject, in a treatise “*de noxiis paludum effluviis*,” published in 1717. This work, which was a matter of deep interest to this country from the rapid extension of our colonies, attracted the attention of the profession, and has laid the foundation of that more full and extensive investigation of the laws of paludal diseases, which has since been so ably prosecuted by Lind, Pringle, and a host of other British and Continental writers. The cultivators, indeed, of this branch of medical science are so numerous, that Montfalcon has enumerated upwards of two hundred, and adds, “*combien m’ont echappé*.” Among the many distinguished physicians he has recorded, the names of Dr. John Hunter, of Dr. Bancroft and of Cleghorn, stand the most prominent. The writings of all these authors are highly valuable, but those of Dr. John Hunter form an epoch in the history of medicine, and for happy selection of detail, clearness of deduction, and a profound knowledge of the general laws which govern this class of disease may fairly rank with the most important additions to modern science.

*Remote cause.*—The facts collected by these writers, shew that every country is unhealthy in proportion to the quantity of marsh, or of undrained alluvial soil that it contains—the inhabitants dying often in the ratio of one in twenty or twenty-four, instead of one in thirty-eight, the usual rate of mortality in healthy districts; and, also, that the diseases which prevail in these districts, are fevers of a peculiar type, varying according to the temperature or latitude of the place, and likewise dysentery.

In Great Britain, the paludal districts are chiefly situated on the eastern coast; and, accordingly, we find in the low alluvial counties of Essex, Cambridgeshire, Lincolnshire and the East Riding of Yorkshire, intermittent fever, remittent fever and dysentery prevailing to a much greater extent than in the rest of the island. Holland is, also, a low alluvial

country, formed by the detritus brought down by the Rhine and the Scheldt, and there is hardly a town in the course of the latter river, or of the islands formed in its waters, in which paludal fever and dysentery do not annually appear. The same diseases, also, prevail in the Dutch towns, situated on the banks of the Meuse, and on the coasts of its internal seas, as Haarlem and Leyden, built on the shores of the extensive, but shallow, Zuyder-Zee.

In France, the extent of undrained alluvial soil is estimated at not less than 450,000 hectares, and each hectare is about two English acres. The more principal portions of this vast tract are situated in the valley of the Auge, on the banks of the Dive, in Normandy—in various parts in the course of the Loire—in Sologne, a considerable district in the Orleanensis—in Bresse, between the sources of the Soane and the Rhone—on the banks of the Garonne, and in much of the southern coast, from the mouths of the Rhone to the foot of the maritime Alps, and all these districts, like that of the eastern part of Great Britain, are liable to paludal diseases, or to intermittent, remittent fevers and dysentery.

The same description of country exists about Seville, Cadiz, and many other towns on the southern coast of Spain. In Italy, also the Mantuan, the Florentine and Roman territories, as well as the whole tract of the Pontine marshes are celebrated for their malaria. The islands of Minorca, Sicily, Sardinia, and also the Ionian Islands, and the northern shores of Africa, have, from the same cause, been greatly fatal to the French and British armies. In these lower latitudes, however, the paludal fevers assume a higher degree of intensity, and the severer remittent and yellow fevers are superadded to the milder forms of intermittent fever—dysentery is also common to these parts. The low tropical coast of western Africa, covered with the sedge, the mangrove and many other noxious weeds that grow on the swampy banks of the great rivers of that country, gives rise to more deadly paludal diseases, and has been more fatal to European life than any other part of the world.

Many parts of Asia and of America, are of similar formation,



and are almost equally pestilential with the low alluvial soil of Africa. The great body of those continents is, for the most part, a vast table land, whose base is bordered by an alluvial deposit of various extent, from a few miles to many, washed down from the mountains by the heavy rains, or else brought down by the many streams and rivers, which take their rise in the higher country. It is in these low districts, that Europeans have principally settled and built their cities for the rich harvests they reap, and for the convenience of commerce ; and the Guzerat, Bengal, the Delta of the Ganges, Surinam, Demarara and Vera Cruz are remarkable for the severer forms of paludal fever to which they give rise.

The structure of the West India Islands is similar to the great continents of America and of Asia. They generally consist of one conical mountain, or a series of mountains bordered by a margin of alluvial soil. The towns are situated, for the most part, on the leeward shore, for protection from the hurricanes, and, consequently, on a level little above that of the sea. Thus placed, and enclosed by high hills, which exclude the breeze and reflect a most intense heat on the low lands, where the settlements of the planter are formed, we cannot be surprised at the severe paludal, or West India fevers as they are termed, which so often desolate these islands.

But paludal diseases are not altogether confined to low alluvial countries, for there is a *hill fever* as well as a marsh fever. Rivers generally take their rise in hilly or mountainous countries, and when they meet with obstacles to their progress, not unfrequently diffuse themselves, forming large watery morasses, that are as favourable to the production of marsh miasmata as the low countries—the banks of a river, or the borders of the sea. In most parts of India, the hilly countries have proved so deleterious and so often fatal to those who have resided in them, that fears were long entertained least the Neilgherry tract might not rise to that higher and healthier zone which is free from paludal fever. Bishop Heber, on approaching the Himalaya mountains from the Rohilcund country, says the whole skirt or margin of the

mountains is surrounded by a thick forest, of nearly two days' journey, with a marshy soil and an atmosphere, during two thirds of the year, "more pestilential than the Sunderbunds or the Grotto del Cane, which even the natives fear to go near, and which, during the rains, the monkeys themselves are said to abandon." As he approaches the forest, he says, the whole horizon, at a little distance, was wrapped in a thick white mist, called "essence of owl," the native name for malaria. The villages, also, through which he passed, he says, were singularly wretched, though there is no want of building materials, and the rate of land is very low. It seems, however, as if the annual ague took away all energy from the inhabitants, who are a very ugly and miserable race of human beings, with large heads and particularly prominent ears, flat noses, tumid bellies, slender limbs and sallow complexions. He represents, also, the Thannadar of Kulleanpoor, who came to compliment him on his arrival, as being as yellow as gold, with his nails as blue as if he had been poisoned, and shaking pitifully with the cold fit of the country fever, which had, he said, hung on him for some months back.\* In the West Indies, many of the islands, as Trinidad, Tobago, St. Lucia and Dominica are also mountainous, covered with dense forests, and intersected with deep and narrow ravines, impervious to the breeze, and in which the rain-water not finding vent, stagnates among a mass of decayed vegetation, and into these districts no European dares to enter.

The connection of a given class of disease with marshy districts is thus clearly established by direct evidence amounting to demonstration, but that no link might be wanting in the proof, there are many instances of paludal countries becoming healthy by draining, and on their being again overflowed, and again converted into a marsh, once more becoming the seat of pestilence. This converse proof of a proposition is extremely unusual in medicine.

Ancient Rome was the seat of so many fatal epidemics,

\* Heber's Journal from Calcutta to Bombay, p. 455—457.



that the Romans erected a temple to the goddess Febris. These arose from the great masses of water poured down from the Palatine, Aventine, and Tarpeian hills, becoming stagnant in the plains below, and converting them into swamps and marshes. The elder Tarquin ordered these to be drained, and led their waters by means of sewers to the Tiber. These subterraneous conduits ramified in every direction under the city, were arched over and were of such considerable height and breadth, that Pliny terms them “*operum omnium dictu maximum suffosis montibus atque urbe pensili subterque navigata* ;” and this system of drainage was continued as late as the Cæsars. When, however, this great city was at length overthrown by the invasion of the Goths, the public buildings destroyed, the embankments of the Tiber broken down, the aqueducts in ruins, and the sewers obstructed and filled up, the whole country was again overflowed, and Rome once more became the seat of an almost annual paludal fever, as in the times of her earliest foundation.

The insalubrity of the Pontine marshes, past and present, is notorious. Three hundred years before the Christian era, Appius Claudius drained them by making canals, building bridges, and by constructing that magnificent road, portions of which still remain and still bear his name. This road, the “*regina viarum*,” was the especial care of the Gracchi, of Julius Cæsar, of Augustus, of Trajan, of Vespasian, and of the Roman emperors, and it was that on which Horace delighted to travel, on account of the number and excellence of its inns for “*minus est gravis Appia tardis*.” On the invasion, however, of Italy by Theodoric—Cæcilius Decius gave a free course to the waters in the neighbourhood of Rome ; and the re-establishment of these immense marshes was one of the many disasters which resulted from the attacks of the Goths on Italy. Their present state is such, that the Tuscan portion of the Maremme, and, indeed, of the whole of that district, may be said in summer to be absolutely depopulated, not a single house retaining an inhabitant, except the guard-houses with a few soldiers and custom-house officers,

and these are relieved twice or thrice during the summer, with the Maremme fever almost invariably upon them.\*

In Sydenham's time, intermittent fever and dysentery were constantly endemic in London; and the mortality from the former cause alone averaged, in a comparatively small population, from one to two thousand persons annually. In the present day, however, intermittent fever or dysentery, are diseases nearly, if not altogether, unknown in London, for the great improvements that have taken place in the metropolis have removed their causes. In former times, it appears that Walbrook, Sherbourne, Langbourne and Oldbourne, were really brooks, often, according to Maitland, choaked up by filth, and in some places the currents so much obstructed as to form pools. A large portion of the country, also, around London was a marsh; Lambeth was a marsh, and, indeed, the banks of the Thames from Lambeth to Woolwich, was one continued swamp. All these parts, however, have been underdrained, extensive sewers formed, the ditches filled up, the river banked out, and the site generally rendered so dry, from being covered with buildings, that London is now unquestionably the most healthy capital in Europe. Many other towns, also, both of this country and of France, as Portsmouth, Rochefort and Bordeaux, from being the constant seat of paludal fevers, have been rendered, in like manner, perfectly healthy by drainage.

The intimate connection, therefore, between marshy districts and certain diseases being established by a great amount of direct as well as of indirect evidence; the next proposition, is what is the nature of the noxious agent, and what are the circumstances necessary to its formation or extrication?

It has been imagined that as heat is rendered more sensible when combined with moisture, that heat might, therefore, be the cause of the insalubrity of marshes. It is mani-

\* The Maremme is that part of the western coast of Italy which extends from the confines of Tuscany to those of Naples; the portion possessed by the Roman Pontiffs, is called the Campagna di Roma.



fest, however, that heat, although combined with moisture, is not the remote cause of paludal diseases ; for in that case, these diseases ought to be more frequent at sea than on shore, which is not the fact. On board the *Barham*, Admiral Fleming, four hundred and fifty men, and victualled for three years on the Jamaica station, and which ship was kept much at sea, the mortality, from the 11th of April, 1827, to the 27th of March, 1830, was only fifteen persons, and three of these died from accidents, or little more than one per cent. per annum ; while the annual average of the army, quartered for the same period in the West Indies, was twelve and a half per cent. annually. It is well known, also that ships of war visit the islands during the prevalence of the epidemics, but by keeping out of port, though they hold constant communication with the shore by means of boats, are often preserved, during these sickly seasons, in a perfectly healthy condition. Neither can dry heat be the cause, for the sandy deserts of Arabia and of Africa, and even the sandy tongues of land in the West Indies, termed “ quais,” are entirely free from this class of specific diseases.

It has been imagined that the moisture produced by the constant evaporation from the surface of the marsh might be the cause. Simple moisture, however, even when combined with heat, it has been shown, will not occasion these affections. In every country, the greatest quantity of rain and mist falls in the mountains, but the inhabitants, for instance, of Wales or Cumberland are little subject to ague or dysentery. Besides, in the West Indies, the mortality, and consequently the amount of paludal disease, does not attain its maximum in those parts where the fall of rain is greatest. The quantity of rain which falls in British Guiana, is at least double that which falls in Jamaica, but the average mortality of the troops is only half as great in the former as in the latter. The Malabar coast, also, which is deluged with rain for six months in the year, is generally considered one of the healthiest quarters in the Madras Presidency. The moisture, therefore, incident to paludal districts, cannot be the cause of paludal diseases.

Volta, being on Lago Maggiore, stirred by chance, the bottom with his stick, when he observed a disengagement of air-bubbles from the mud, and that those parts disengaged the greatest number which was richest in decayed vegetable matter. These gases he collected, and found them to consist of carbonic acid, azote, oxygen, and of carburetted hydrogen—are either of these gases the cause of paludal diseases? It would appear not, for all of them have been separately respired without producing any such effect. The three first exist harmlessly in the atmosphere, while carburetted hydrogen is met with in great abundance, as the “fire damp” in coal mines; but although the workmen are sometimes dreadfully injured from its inflammable properties, yet no class of persons is more free from paludal disease than the labouring collier.

It seems proved, therefore, that the deleterious agent is neither heat nor moisture, nor any gas extricated by the marsh, and it follows, almost as a necessary consequence, that the remote cause of paludal diseases must be a miasm, poison, or *malaria*, whose presence is solely detected by its action on the human body. Two hypotheses have been imagined to account for the origin of this poison. The one, that it is a product of vegetable decomposition; the other, that it is an exhalation from the earth, favoured by the conditions of the marsh. Many difficulties beset either of these, but the objections to the hypothesis of vegetable decomposition are far less numerous than to that which considers it as the result of simple terrestrial exhalation.

The general evidence in favour of vegetable decomposition being the remote cause, is that all countries are, for the most part, free from paludal diseases while the crops are growing, and only become unhealthy after the harvest, of whatever nature, is cut, and when large quantities of vegetable matters are left on the ground at the time the rain begins to fall. It may be said that, except rice, we neither sow nor reap in marshes. This is undoubtedly true, but it will be seen hereafter that marshes are, in general, healthy till the summer's sun, or other cause, has diminished



their waters and bared a greater or less portion of their base. The part thus exposed, almost always contains a large portion of vegetable matter, which running into rapid decomposition, generates the poison which gives rise to this fatal class of disease.

The particular evidence of vegetable decomposition being the source of this poison, is as follows:—Lancisi, for example, gives the history of an epidemic, intermittent, or remittent fever, which for several summers infested and almost depopulated the ancient town of Urbs Vetus, situated on an elevated and salubrious part of Etruria, and which was traced to the circumstance of the peasants steeping their flax in some stagnant water in the neighbourhood of the town. This practice was, therefore, prohibited in 1705, and the epidemic ceased to appear. The apprehension of the steeping of flax being productive of paludal fever, is not limited to Italy, for the ancient as well as the new ‘coutumes’ of almost all the provinces of France, have proscribed the steeping of flax, “la rouissage,” even in running waters, from the fear of infection, and this prohibition forms part “du droit public” of that kingdom.\* In the Netherlands, also, the same belief prevails or has prevailed; for in July, 1627, the King of Spain passed an ordinance, prohibiting the steeping of flax in the streams and canals of Flanders.

The experience of the indigo planter, is also to the same effect. In India, after the colouring matter has been extracted from the indigo plant, it was formerly the custom to throw the detritus into large heaps or masses in the immediate neighbourhood of the works, and which at the end of three or four years, became manure of an excellent quality. It was found, however, that these heaps wetted from time to time by the heavy rains, and afterwards heated by the vertical rays of a tropical sun, rapidly decomposed, and at length emitted miasmata, which produced all the effects of those extricated from the marsh; for the workmen who lived near, and more especially those to leeward of these fermenting

\* Dictionnaire d'Agriculture de l'Abbé Rozici, vol. ii, p. 435.

masses, were found to be very commonly attacked by fever, chiefly of the remittent type, and similar to those that prevail in the paludal districts of that country. This consequence is now so well established, that the most intelligent indigo planters no longer allow these heaps to be formed either near the works, or in the immediate neighbourhood of the cottages of their workmen.

Ships afford, also, additional evidence of the truth of the hypothesis of vegetable decomposition being the remote cause. The *Priamus* frigate underwent some repairs at Plymouth, previous to a voyage to the West Indies, but the chips and shavings, instead of being removed, were suffered to remain, and to mix with the bilge water under the limber boards. On the voyage, the foul state of the hold was indicated by the most offensive smells, and at Antigua, a fever broke out, which daily destroyed increasing numbers. The true cause was not as yet suspected, and a voyage was undertaken as a means of mitigating the calamity, but without success. The ship at length returned to Antigua, and the state of the hold was examined into, when Mr. Hartle, one of the medical officers, gives the following account. When the limber boards were removed, the effluvium surpassed every thing he had before experienced—a boatswain looking into the hold, fainted, and afterwards passed through a formidable attack of the disease. Every individual, also, present, was likewise attacked, and Mr. Hartle himself suffered from a slight indisposition. Although the frigate had only been six months from England, four large mud-boats of filth were removed from her, which lay nine inches deep in the hold. The negroes, also, employed in removing this mass, were obliged to go on deck occasionally, so insufferable was the stench, and three of them had the characteristic disease. The after magazine, immediately under the gun-room, was found in the worst state, and this accounted, in the opinion of Mr. Hartle, for every officer's servant and every servant of the gun-room mess having suffered. Several cases occurred after the removal of the crew, in consequence, as was discovered, of the men having gone on board clandestinely. The ship



having been cleansed and thoroughly purified, the general health of the crew was restored, and on their returning on board, continued good.

These facts render it highly probable that the noxious agent must be a product of vegetable decomposition, changed from a fixed to an acriform state, and evolved into the lower region of the atmosphere. But it must be admitted no eudiometry has yet been able to discover the immediate principle. The air collected at the embouchure of the Valtelline, a country where it is impossible to sleep without being attacked with fever, gives the same constituent parts and proportions of the atmosphere as that collected at the summit of the Alps or in the narrowest street in London. Morcati has condensed the exhalations of the marsh as they arose by means of glass globes filled with ice, but these experiments have not led to any discovery, nor in the least degree elucidated the subject.

If we consider the paludal poison to be a product of vegetable decomposition, it follows that heat and moisture, quantity of vegetable matter, and nature of the soil must have a sensible influence on its formation—thus limiting paludal diseases to particular localities, seasons and latitudes. A certain temperature, also, is necessary, for should it exceed a given limit, the vegetable substance rapidly parting with its juices, is dried up or charred even before decomposition commences. Thus in all tropical countries, even the most pestilential, the hot season is the season of health, and during the dry period of the year, most parts of that country are as pleasant and healthy as any part of the world. But no sooner do the rains fall and the parched crust of the earth softens, than vegetable decomposition commences, and the ground emits a most offensive stench, and a general and violent sickness follows. On the other hand, in countries of a low temperature, as towards the polar regions, the decomposition of vegetable matter is so slow, that even the marsh is healthy.\* It follows, also, that a certain quantity of mois-

\* It is generally supposed that marsh miasma requires, for its produc-

ture is as necessary to vegetable decomposition as a certain temperature, and that the extrication of the paludal poison will be most abundant from that soil which contains no more moisture than is necessary for that process, for an excess in quantity by dividing and separating the particles, and by preventing the access of atmospheric air, will either retard or altogether put a stop to putrescency. This law is most important, as it explains the reason, why in some countries, as between the tropics, frequent and heavy rains will render marsh fevers prevalent by saturating the whole of the open country—while the privation of rain will in others produce exactly the same effect.

In the year 1799, the army under the Duke of York remained the whole autumnal season in the most pestiferous parts of Holland and the Netherlands without suffering in any remarkable degree, for remittent fever was nearly unknown—intermittent fever occurred but rarely, and dysentery was about the only serious disease they encountered. But the preceding summer had been cold and wet in a remarkable degree, and during the whole campaign, the rain fell incessantly, and the country was nearly flooded with water. In the year 1810, however, a year remarkable for the beauty and dryness of the summer, it is well known that the British army at Walcheren, a soil as similar as possible and certainly not more pestiferous, suffered from the endemic fever of the country, and to a degree nearly unprecedented in the annals of European warfare.

In 1810, the army advanced to Talavera through a very dry country, and in the hottest weather fought that battle which has rendered that town for ever celebrated. The victory was followed by a retreat of the British army through the plains of Estramadura along the course of the Guadiana river, at a time when the country was so dry and arid that the Guadiana itself, and all the smaller streams were no more than lines

tion, a heat of 60°; it is certain, however, that paludal fevers do not appear within the arctic circle, and it is doubtful whether they appear beyond 57° or 58° N. Latitude. The only exception to this rule is St. Petersburg, where ague was at one time endemical along the Neva.



of detached pools. Under these circumstances, the army suffered from remittent fever of such destructive malignity, that the enemy and all Europe believed that the British host was exterminated. The aggravated cases differed little or nothing from the worst yellow fevers of the West Indies.\*

The Alentejo country on the other side of the Tagus is low, flat and sandy, and flooded during the whole of the rainy season. At the time, however, of the periodical sickness, it is most distressingly dry, and exactly in proportion to the dryness of the soil, is the amount of sickness. Every person who has the means of escape flies the place. "I have visited it at these times," says Dr. Fergusson,† "and found it the most parched spot I ever saw—the houses of the miserable people left behind, being literally buried in a loose dry sand that obstructed the doors and windows."

Ciudad Roderigo is situated on a rocky bank of the river Agueda, a remarkably clear stream, but the approach to it on the side of Portugal, is through a bare hollow open country, that has been compared to the dried up bed of an extensive lake, and upon more than one occasion, when this low land, after having been flooded in the rainy season, has become as dry as a brick, and the vegetation utterly burned up—there arose fevers among our troops, which, for malignity of type, equalled those that occurred on the Guadiana.

The effects of different quantities of moisture in influencing the extrication of the miasmata, has been often observed in the West Indies. Thus an uncommonly rainy season seldom fails, in the perfectly dry and well-cleared island of Barbadoes, to induce, for a time, general sickness. While at Trinidad, whose central portions are described as "a sea of swamp," and where it rains nine months in the year, an excess of moisture is the best preservative from sickness, for should rain at any time fall only eight months in the year, instead of nine, the worst kinds of remittent fevers are sure to make their appearance. In Jamaica, the north and mountainous side of the island, is unhealthy in the dry season, while the wet season is the scourge of the southern and more level portions.

\* Fergusson Med. Chir. Trans. p. 4.

† P. 6.

The following fact is an excellent exemplification of the principle that has been laid down :—In the war of 1745, the country around Breda had been inundated, and the water kept up for military purposes. The preliminaries of peace, however, having been signed in the year 1748, the waters were let off, and the ground which had been covered by them, was laid bare and exposed to the rays of the sun. The consequence was, that a remittent fever of great fatality broke out in Breda and in the adjacent villages, so that the States of Holland found it necessary to give orders again to inundate the country, and to keep up the water till the approach of winter. This was done, and the epidemic fever immediately ceased.

Rice grounds, which are alternately overflowed and drained for cultivation, are another proof of this law. Seringapatam is one of those noxious spots and so devoted to fever, that, according to Mr. Orton, it should be shunned by man if he is unable to remove the cause. It lies in a basin, surrounded for a considerable distance by rice fields, and embossomed on all sides by hills. Much of the ground is formed into a succession of terraces, kept continually overflowed while the rice is growing, but suffered to dry up for ripening ; and it is at this latter period, the fatal fevers that devastate this district, prevail. The insalubrity of rice grounds is, indeed, so well known, that the cultivation of that vegetable is prohibited by law in many of the states of Italy. The same result also takes place on the subsiding of the waters of rivers that have overflowed their banks, as those of the Rhine, the Danube, the Tigris or the Nile.

It is evident from the foregoing examples, that the swamp, on its approach to dryness, is the harbinger of disease and death, while an excess of rain is a preservative power. On the contrary, in the rich and dry plains, and even on the hills of tropical countries, rain is the cause of disease, while dryness is the preservative of health.

In estimating, however, the dryness of a country, its superficial appearance is often deceitful. In the years 1748 and 1794, the summers were dry, and our troops took up the encampments of Rosendral and Ousterhout in South



Holland. The soil, in both places, is a level plain of sand with a perfectly dry surface, and where no other vegetation existed or could exist, but a few stunted heath-plants. Yet in both years, fever became epidemic among the troops in each place. On digging, however, for water, the cause was discovered, for the soil was found to be percolated with water to within a few inches of the surface. It is probable, therefore, that this country was originally formed of vegetable, and other detritus brought down by the Rhine and the Waal, and afterwards covered with sand thrown up by the sea, and which, heated by a summer sun, became the powerful cause of the extrication of marsh miasmata.

From the exceeding malignity of the salt marshes in the south of France, Naples, Tuscany and the states of the Church, it has been supposed that a mixture of salt and fresh water rendered a marsh more pernicious than either of them alone, on account of its destroying certain animals and vegetables that can exist only in the one or the other medium. It has been found, however, that on coasts where these marshes have been kept up to one uniform level, by means of flood gates, as on the southern coasts of England, that the surrounding country is healthy. It has, therefore, been inferred that the sickness produced was a consequence of the perpetual alteration of the level of the waters of the marsh, and not owing to the admixture of the sea and spring waters.\*

\* There is one exception—probably only an apparent one—to the extrication of paludal miasmata in marshy districts, or the bog country of Ireland. In Ireland, this description of country is certainly not less than 700,000 acres, and maintains a population so redundant, that every island or peninsula contains more than the usual proportion of inhabitants. The exception of a country apparently so favourable to the production of marsh miasmata from paludal diseases, requires some explanation. It has been stated that simple moisture is innocuous, and only injurious in proportion to the quantity of decomposed vegetable matters it may hold in solution. Now the bog country contains very few vegetables that have any tendency to run rapidly into decomposition. They very principally consist of mosses, interspersed with a small portion of heath, fern and a few grasses. The decomposition of the bog-moss is so slow, that

These facts seem, therefore, unquestionably to prove that heat and moisture, though not the primary cause of paludal disease, are conditions essentially connected with the extrication of the noxious miasmata, and consequently are a strong additional argument in favour of the hypothesis of vegetable decomposition, generating the remote cause which produces them. It is certain, however, even where the conditions of heat, moisture, and vegetable matter most abound, that the paludal diseases do not always assume their severest forms; thus Jamaica is more unhealthy than Demarara; Demarara than Barbadoes; and taking the West Indies generally, that country is more unhealthy than the East Indies. There must be other circumstances, therefore, affecting the problem in question, and there seems reason to believe that differences of geological formation by favouring, or otherwise, vegetable putrefaction, may greatly affect the health of countries similarly situated.

It is perfectly well known, for instance, that different soils radiate heat with very different degrees of intensity, and, consequently, are, under the same circumstances, of very different temperatures, and also that they have a very different power of attracting moisture, and possibly, also, they may have other and more direct chemical affinities. Nothing is better

it can scarcely be said to rot in water, and it possesses a vitality so great, that when dried and apparently dead, it may be revived on again placing it in water. Neither does its leaves fall off, so as to afford any quantity of dead vegetable matter, and in the opinion of botanists, the plant is destroyed solely by the weight of the successive shoots, sinking it deeper and deeper below the surface of the water, and thus depriving it of atmospheric air. From this cause, it undergoes an imperceptible decay, and, consequently, the decomposition is too slow to afford any sensible quantity of marsh miasmata. It appears, also, that peat contains a considerable portion of *tannin*, a well-known antiseptic, and in such quantity, that acting on the ferruginous waters of the bog, it changes the colour of the trees buried beneath its surface to a deep black. The peat bog has, also, the property of preserving not only vegetable, but even animal substances from putrefaction, so that, according to Dr. Bancroft, not only plants and trees, but even human bodies with their clothing, when completely immured in a peat soil, will scarcely undergo any change during a long course of years.



determined in husbandry, than that carbonate of lime mixed with the ordinary matters of a compost, greatly forward the processes of putrification, so that the mass thus prepared, is fit, in a much shorter time, for the purposes of manure. The causes which occasion this rapid decomposition have been investigated by Sir Humphrey Davy, and he has ascertained that lands situated in calcareous countries, like the West Indies, where the surface is a species of marl a few inches deep, lying above limestone earth, are extremely hot, and attract moisture largely. The latter fact, he infers from pulverized chalk, absorbing eight tenths, and clay, two and a half times their own weights of water. The different powers of absorption of different soils, he adds, is often beautifully seen in this country, for the sand-stone and lime-stone hills of Derbyshire and of North Wales, for example, may be easily distinguished from each other at a considerable distance by the different tints of the vegetation; the grass on the sand-stone hills being usually brown and burnt up, while that on the lime-stone is flourishing and green. White, in his "History of Selborne," has also remarked how powerfully attractive of moisture are the lime-stone hills, for he says, "No springs arise on chalky hills, since the waters of so impervious a soil as chalk, all lie on one dead level. Still the ponds on these hills are always full." Now if the difference in the absorbing powers of different soils is so striking in this country where the atmosphere contains only one 75th of its weight of vapour, how much greater results must arise from it between the tropics, where the atmosphere contains three times that quantity, or one 21th part of its own weight of vapour. It appears, therefore, that there are soils more peculiarly favourable to the rapid decomposition of vegetable matters, and, consequently, to the more abundant extrication of marsh miasmata, and it is remarkable, that those countries most celebrated for paludal fevers, have a soil similar to that which has been found most to favour rapid vegetable decomposition.

On examining the geological structure of the West India Islands, it is found that lime of secondary formation is a predominant ingredient mixed with much volcanic matters,

while the superincumbent soil in the cultivated parts is clay forming a chalky marl. This formation is sufficiently remarkable in Jamaica, and produces, it is said, a turf as close, smooth, and even, as that of the finest English lawn and much brighter in colour. No part of the West Indies also abounds in so many delicious streams, every valley having its rivulet, and every hill its cascade, and in these conditions we may clearly trace the sources of the greater prevalence of paludal fevers in this island\* over Barbadoes. In the latter, the most striking feature is the general dryness of its soil, for there is scarcely any marsh land, except a small swamp at the bottom of the carenage in Bridgetown, only a few running streams, and neither lagoons nor standing water. These differences, perhaps, explain the cause of Barbadoes being so much more free from fever than Jamaica, although there are seasons in which its inhabitants suffer severely. The soil of British Guiana is altogether dissimilar from that of the West India Islands, being for the most part, alluvial, and rich in vegetable matter, and it is well known in this part of the world, the paludal diseases, though sometimes extremely severe and fatal, are for the most part less so than in Jamaica.

The Campagna di Roma is likewise celebrated for its severe paludal diseases, and its structure is supposed not to be dissimilar to that of the West Indies, for the neighbouring mountains being calcareous, it is conjectured that the immediate stratum under the volcanic effusion is calcareous, while the superstructure is a yellowish or reddish earth composed of clay and sand, and covered with a surface of black vegetable earth.

It is probable that the severe paludal diseases which occasionally appear in the rocky and volcanic countries of Europe, as Gibraltar, many parts of Spain, and of the Ionian Islands,

\* "In this mountainous country," says Dr. Arnold, "the water rushes down in torrents during the rainy season, forming deep gullies, and carrying with it various descriptions of vegetable substances, which, on the water subsiding, become exposed to the rays of the sun in the flats, and there remain a sufficient time to undergo the process conducive to pestilence."—P. 27.



also, owe their intensity in part to a similar peculiarity of geological formation. These countries are generally quoted as exceptions to the general rule of paludal diseases being caused by a poison generated during vegetable decomposition, but, perhaps, a fuller consideration of this subject will show that they fall entirely within the alleged law. It is on the summits of these high rocks of secondary formation, that natural springs arise, which together with the mists condensed on their tops, give origin to the many streams which flow under their surface, and penetrate their strata. The slightest frost also produces fissures, into which mould and vegetable matters insinuate themselves, so that when summer comes and the streams are dried up, the heated rock resembles the bared bed of a marsh, together with the additional circumstance of the vegetable debris being brought into direct contact with calcareous earth, which has been shown to be the cause of such rapid decomposition both in the West Indies and elsewhere. Under these circumstances, we can hardly be surprised when the other necessary conditions are present, that the hidden elements of the pestilence should be suddenly roused into existence. If we apply these data to Gibraltar, we shall find this rock, though apparently a dry and arid surface of grey limestone, much intersected by deep gullies, while wherever artificial excavations have been made, the rock is found to be percolated with water. In St. George's cave which penetrates 400 to 500 yards in the rock, water is found to be constantly distilling from the roof and forming many stalactite productions. Dr. Hennen conceives the internal supply to be inexhaustible, and if wells were deeply sunk—capable of supplying the whole British navy with water. There are many other similar examples capable of the same explanation.

In May, 1809, the British army advanced to Oporto, for the expulsion of Marshal Soult from Portugal. The weather was very cold and wet for that country, yet the troops did not suffer from any diseases, but the ordinary ones of the bivouac. But in June, however, says Dr. Fergusson,\* which

\* Trans. Royal Society of Edinburgh.

was remarkably hot and dry, marching through a singularly rocky country of considerable elevation, several of the regiments, contrary to the advice of officers who had served in the Mediterranean, bivouaced in the hilly ravines, which in the winter had been water courses. The next morning, and before they could move from the bivouac, several of the men were siezed with violent remittent fever, the first which had shewn itself on the march, and this portion of the troops was, for a considerable time, exclusively affected. Humboldt on ascending the Orinoco, found the station at the great fall, depopulated by fever, which the natives attributed to the noxious exhalations which arise from the bare rocks of the rapids. He determined the temperature of these rocks to be during the day,  $118.4^{\circ}$ . The heat was stifling, and this extraordinary degree of temperature occurred when the thermometer stood only at  $78.8^{\circ}$ . At night, the heat of the rock declined to  $85.5^{\circ}$ . These instances, therefore, though they may appear extraordinary, are not necessarily exceptions to the general law of paludal diseases being caused by miasmata, generated by vegetable decomposition.

It is highly improbable we shall ever arrive at such an exact knowledge of the causes which affect the extrication of marsh miasmata, as to enable us to predicate all the facts connected with paludal diseases. The variations of atmospheric temperature, the changes in the nature and quantity of its electricity, the quantity of water, the nature of the soil, the amount and character of the vegetable matters form a problem extremely complicated, and one whose smallest variation, either as to quantity, or time may occasion marked differences in the result.

As a general rule, however, it may be stated that in no climate do paludal fevers prevail to an equal degree all the year round. In the winter, much of the vegetable matter has already undergone decomposition, while the dryness of the season and the diminished temperature are little favourable to further putrifaction. When the spring, however, arrives, and the rain falls, and the heat of the sun increases,



the earth again opens its bosom and a miasm of mitigated intensity is again developed. In summer, the products of vegetable decomposition are used up in affording nourishment to the growing crops, and this season, like the winter, is in general, healthy. But in the autumn and after the harvest has been gathered, when the ground is covered with its debris—when the rain falls in torrents, and when the solar heat has acquired its greatest intensity, all the conditions of greatest quantity of vegetable matter, of moisture and of highest temperature are united, so that the season which realises the hopes of the husbandman, is the period of pestilence and of his greatest danger. The truth of these observations may be seen in the tables illustrating the influence of the seasons on the health of the troops in each station in the West Indies, and which show that the greatest number of admissions into hospitals, and deaths has on the average of a series of years, though not uniformly in each year taken place in the three autumnal months;\* a period which is, of course, later in the Northern than in the Southern portions of the Northern hemisphere. There are two other facts, also, relative to this poison, which stand out too prominently to be mistaken. The one is, that the miasmata vary greatly in intensity in different countries, and, also, in different parts of the same country. Again, the diseases they produce, though annually endemic in given districts, yet become in certain years, and from the action of causes, not yet determined, epidemic, or in other words, in one year they are very malignant, and in others comparatively mild.

The proof that the miasmata vary greatly in intensity, is, that paludal fevers vary in severity in different countries,

\* Dr. Arnold, who has kept an exact register of the atmospheric temperature for twenty-five years in Jamaica, gives the following as the results.

	Minimum.	Maximum.	Extreme solar heat.
From January to March . . .	70°	80°	100°
April to June . . . . .	70°	80°	110°
July to September . . . .	75°	85°	125°
October to December . . .	70°	84°	100°

and even in the same country under different circumstances assuming the forms of intermittent, remittent, and yellow fever. In this country, where the summer is short, and but moderately hot, the type of the marsh fevers is not usually of a dangerous character, and they are, for the most part, mild intermittents only occasionally assuming a remittent form. In Holland, the Netherlands, and in the North of Germany, the intermittents are of a bad kind, and not unfrequently\* become remittent. In the still hotter climates of Spain and Italy, as well as in the more tropical regions, the intermittent is less common, while the remittent is frequent, violent, and not unusually assumes the form of yellow fever.

It is remarked in the Antilles, and on the continent of America, from Boston to Rio Janiero, and also on the continents of Asia and Africa, that while in the low countries, the yellow fever occasionally, and, indeed, almost annually, prevails, still, that in the higher country, under similar circumstances of locality, intermittents and remittents prevail. The interesting fact stated by Humboldt, that the vomito prieto never appears in the table lands of Mexico, is strictly in accordance with the observations made in every other part of the world at a similar elevation above the level of the sea.

These different forms of disease can only be owing to different intensities of the same poison, generated by difference of temperature, and, consequently, must be limited to different latitudes, or to its equivalent difference of elevation above the level of the sea. It may be affirmed, therefore, of the paludal poison, and consequently of paludal fevers, that they are altogether unknown in Europe to the North of the Neva, and that they gradually become of greater and greater intensity, till in lower latitudes, the average summer heat reaches 80° or upwards, when the poison acquires its greatest intensity, and produces the severest forms of remittent, and of yellow fever. In plains, however, or table lands of the equinoxial regions, when considerably elevated above the level of the sea, the paludal poison and the fever it produces

\* Pringle, p. 6.



become milder and milder, in proportion to the height ; so that the yellow fever gives place to the mild remittent, and the mild remittent to the intermittent, and, at length, at altitudes considerably below the snow line, even in tropical countries, they become altogether evanescent.

The fact that paludal diseases, like most of the diseases produced by morbid poisons, are annually endemic, and only occasionally epidemic, is also unquestionable. A few years ago, intermittent fever was epidemic in particular districts in this country, but of late years ague has been rarely seen in London. In Demarara, it is observed that yellow fever is epidemic about every seventh year. At Gibraltar, although sporadic cases of paludal fever occur annually, still yellow fever is only occasionally epidemic. It is said, first to have assumed that character in 1804, then in 1810, in 1813 and in 1814, and from that period the garrison suffered from no similar visitation till 1828.

Jamaica is more subject to epidemic paludal fever, than the other West India stations. These epidemics greatly prevailed in 1819, 1822, 1825, and in 1827, and in some stations, and in some corps raged with such severity that nearly one-half died of those attacked. What are the physical causes on which this greater virulence and greater spread of the disease depends, are not determined.\* In temperate climates, it has generally been remarked that paludal fevers have been most epidemic, when a hot summer has succeeded a previously wet season. In the West Indies, however, they often appear without any warning, and often at periods when the troops have for some time enjoyed a comparative immunity from disease. Their appearance cannot be said to be confined to any particular season of the year, for the results on this head, are by no means uniform, though the prepon-

\* The climate in the West Indies varies little ; one year is like another, and six or seven years have elapsed without our meeting with more than one or two cases of yellow fever, and in the present year, the climate apparently remaining the same, every new European is affected ; an additional cause is, therefore, in operation.—Jamaica Physical Journal, Arnold on Fever, p. 135.

derance has been greater during the last two, than the first two quarters. In the year 1827, in the three months prior to June, only twelve deaths were reported; the next quarter, remittent fever broke out, and among a diminished force, the deaths amounted to 252 in the same period, and this without any remarkable change in the weather, the thermometer indicating an increase of temperature of not more than about three degrees.\* The following table, however, will shew the proportionate mortality of the different seasons in four years, in which yellow fever was epidemic in Jamaica.

	1819	1822	1825	1827	Total
Died from 21st Dec. to 20th March	40	126	132	53	351
21st March to 20th June	56	182	91	12	341
21st June to 20th Sept.	413	55	241	252	962
21st Sept. to 20th Dec.	245	76	319	319	952

Having thus stated the general laws which relate to the extrication of marsh miasmata, it will now be necessary to ascertain those limits within which the poison issuing from its source may infect the human body.

*Infecting distance.*—The miasmata generated by the human body, are in general limited in their power of infection to a very few feet around the patient's person, but the spread of marsh miasmata is of infinitely wider range, both altitudinally and laterally. As a general law, the danger of infection is in proportion to the proximity to the source; but

\* In tropical countries there are two wet and two dry seasons, but as the rains follow the course of the sun, it is obvious, that the periods of their commencement and duration, must vary according to the proximity of the settlements to the equator. In Guiana, the most southerly, the spring rains generally extend from December to January, the autumnal from May to August, while in the most northerly of these settlements, the former does not commence till April or May, and the latter extends from October to December. During the rains, particularly at their commencement and termination, thunder and lightning are very common, but seldom occur at any other period of the year. Between the month of August, and the latter end of October is the hurricane season. Trinidad, Tobago, and the settlements to the South, have hitherto been exempted from them.



there are many disturbing causes, which produce many remarkable exceptions to this law, and render the solution of the problem of extreme difficulty, as the extent of surface which generates the miasmata, their intensity, the force by which they may be attracted by the surface over which they are carried, the direction of the wind, the season of the year, and the time of the day. These data are so multifarious, that it is impossible, in every case, to assign the true distance. It will, therefore, be better to select a few of the best authenticated facts which demonstrate the general principle, and then to add a few examples, showing the manner in which the disturbing causes may affect it.

The *Altitudinal range*.—The Monte Mario, which adjoins Rome, is, according to Breyslack, about one hundred and sixty-five yards, perpendicular height, above the Pomptine marshes, and is extremely unhealthy. Tivoli, which is about two hundred and thirty yards above the level of the same marshes, is infinitely more salubrious. While at Serre, three hundred and forty yards perpendicular height, the inhabitants enjoy a perfect exemption from the paludal diseases which prevail below. Montfalcon's calculation something exceeds this of Breyslack's; for he estimates the altitudinal range of the miasmata to be from fourteen hundred to sixteen hundred feet, beyond which limits, he supposes, infection cannot take place in Europe.

In the West Indies, and in tropical countries where the poison is of so much greater intensity than in Italy, a still greater elevation appears to be necessary to afford an entire protection. The great severity with which fever has prevailed at Fort St. George, at Tobago, Morne Fortune, at St. Lucia, at Morne Bruce, and at Dominica, demonstrate that a height of six hundred or seven hundred feet, instead of securing a healthy position, has rather a reverse tendency. The records of the mortality at Stoney Hill, a post which commands the grand pass intersecting the island from north to south, show that even an elevation of one thousand three hundred and sixty feet is insufficient to secure an immunity from the remittent fever of Jamaica. The details, however,

of the troops at Maroon town\* and some of the smaller outposts, demonstrate, beyond a doubt, that an elevation of two thousand to two thousand five hundred feet, gives either a total exemption from paludal disease, or else so modifies it that the mortality from all causes will not, on an average of a series of years, materially exceed that of an equal number of British troops doing duty in the capital of their native country. Humboldt has stated that yellow fever is unknown at the height of two thousand five hundred feet above the level of the sea in the tropical countries of the continent of America, so that the nearer this boundary can be approached, the more likely is the health of the troops to be secured.† Dr. John Hunter was of opinion that three hundred to five hundred feet, perpendicular height, secured an immunity from the severer forms of paludal fever in the West Indies; but the instances he relied on, as the different stations of Prince Rupert's Bay, in the Island of Dominica, have proved fallacious; for however important the line of works, their extreme unhealthiness has caused them to be either abandoned, or else only kept by a few black troops. It would appear, however, that in certain years, such distances are an efficient protection, for Dr. Fergusson states that he has seen the troops mount the night guard in perfect health in the dock yards and among the marshes in Antigua, and be seized with furious delirium while standing sentry, and when carried to the barracks on Monk's Hill, expire in all the horrors of the black vomit, within thirty hours from the first attack. But during this time, not a single case has occurred among the inhabitants of Monk's Hill, a rock rising perpendicularly to the height of six hundred feet above the level of the same marshes. The result on Ridge Hill, about one hundred feet lower, was not quite the same, but equally curious and in-

\* The thermometer at this station seldom rises higher than 80°, and sometimes at night, or towards the dawn, it is in winter as low as 52°.—Arnold on fever, p. 191.

† Statistical Report on Sickness, etc. of Troops in the West Indies, p. 103.



structive. The artillery soldiers never took any of the night guards, but they occupied a barrack three hundred feet above the marshes, not perpendicularly above them, like Monk's Hill, but a little retired; not a case of yellow fever or black vomit occurred among them, but every man, without a single exception, suffered an attack of ordinary remittent, of which one of them died; and at the barrack on the top of the ridge, at the height of five hundred feet, and still further retired, there scarcely occurred any fever worthy of notice.\*

In towns partially freed from marsh miasmata, by extensive drainage, the difference of a few feet, perpendicular height, makes an almost inconceivable difference in the liability of persons to paludal disease. The barracks of Spanish Town, the capital of Jamaica, for instance, consist of two stories, or of a ground floor and of a first floor, and it was found that two men were taken ill on the former, to one on the latter; a difference of mortality so great as to cause the Assembly to direct that the ground floor should be no longer occupied. Dr. Cullen remarked a similar result at Porto Bello, Dr. Fergusson in St. Domingo, and Sir Gilbert Blane in the last expedition to Walcheren. This law is so well understood in the West Indies, that in Demarara, and in many other parts, the houses are built on dwarf columns, after the manner of our corn stacks, in order that a stratum of air may be interspersed between the house and the ground. In Rome and in other towns of Italy, it is also well known that the lower rooms of the houses are abandoned to the servants, the family occupying the upper stories, as affording a greater protection from the paludal poison.

Such are the imperfect data we at present possess for determining the altitude to which marsh miasmata may ascend, a problem whose perfect solution depends on a knowledge of the different capacities of air at different temperatures for vapour.

The cause of the greater exemption from paludal fever at

\* Med. Chir. Review, Dec. 1821.

small heights, is evidently owing to mere difference of temperature, for Dr. Wells has shown that a thermometical difference of  $6^{\circ}$   $8^{\circ}$   $10^{\circ}$  and even  $20^{\circ}$  of temperature often exists between a thermometer placed on the ground and one hung up at no great height in the open air. But air, according to its temperature, has different capacities for vapour. Thus at  $32^{\circ}$ , air can contain only one 150th part of its own volume of vapour, while at  $52^{\circ}$  it will contain one 85th part of its volume; and in like manner, air at  $60^{\circ}$  will contain the larger proportion of one 56th, and at  $100^{\circ}$  no less than one 20th of its whole volume of vapour. It will be plain, therefore, when such differences of temperature exist as have been observed by Dr. Wells, that the vapour or dew will be copiously deposited on the ground, while at small heights, the greater warmth of the air will enable it to hold much larger quantities of vapour in suspension, and supposing the vapour to be combined with the marsh miasmata, it follows that a much larger portion of the poison will be set free in the former than in the latter case. Again, with greater increase of height, the air grows colder and is more rarified, and thus a decrease of temperature combines with decrease of atmospheric density to diminish the quantity of marsh miasmata impinging on any given space. For instance, supposing the barometer stood at the top of Mont Blanc\* at fifteen inches, the atmosphere being diminished to one half its weight, the same quantity of air will, at this altitude, occupy twice the space it would at the foot of the mountain. While, if the thermometer stood at  $32^{\circ}$ , the same volume of air would contain only one ninth part of the vapour it would have done supposing the thermometer to stand at  $100^{\circ}$ . It will be plain, therefore, that the quantity of vapour, and, consequently, of marsh miasmata, would be only one 18th part at the top of Mont Blanc, of what it would be in the same weight of air at the level of the sea. This is, of course, an extreme example, but the application of the rule to lower height is palpable and obvious. The different effects which may be produced at the

\* De Saussure determined the barometer to stand on the top of Mont Blanc at 16.181 inches, and the thermometer at  $27^{\circ}$ .



same heights, must probably depend on the relative situation of the marsh, the condition of the winds, the interposing obstacles, and the different attracting force of the soil itself.

The *lateral* or *horizontal* spread of marsh miasmata, is a question still more difficult to determine than that of the altitudinal range. The least complicated cases are those where *water* alone intervenes between the marsh and the recipient. In the year 1746-47, while our troops lay in Zealand, the sickness was so great among the four batallions quartered there, that some of those corps had scarcely one hundred men fit for duty, or less than one seventh part of a batallion. In one corps, the Royals, only four men escaped the fever. At the time, however, of this remarkable prevalence of fever on shore, Commodore Mitchell's squadron lay at anchor between South Beveland and the Island of Walcheren, and the fever raged at both places, but, nevertheless, in the midst of all the sickness that reigned around, the seamen were neither affected with fever nor flux, and continued to enjoy perfect health. These observations of Sir John Pringle were fully confirmed by those of Sir Gilbert Blane, during the last disastrous expedition to Walcheren. "I had," says this physician, "an opportunity of observing "the extent to which the noxious exhalations extended, "which was found to be less than was generally known. "Not only the crews of the ships in the road of Flushing "were entirely free from this epidemic, but also the guard- "ship, which was stationed in the narrow channel between "this island and Beveland. The width of this channel is "about six thousand feet; yet, though some of the ships lay "nearer to one shore than to the other, there was no instance of any of the men or officers being taken ill with "the same disorder as that with which the troops on shore "were affected." It appears, therefore, that in Europe, the horizontal spread of marsh miasmata over fresh water, is less than three thousand feet.

Sir Gilbert Blane is also of opinion that in tropical climates, ships at a distance of three thousand feet from swampy shores—a distance to which the miasmata did not

extend in Zealand—and even further, were affected with the noxious exhalations. He states that cases of this kind fell under his own observation in the West Indies, and adds, “I have been credibly informed of the like facts with regard to the India ships in the channel which leads to Calcutta.” This experience of Sir Gilbert Blane, of the greater horizontal spread of the paludal poison over *salt water* in tropical climates, is supported by Dr. John Hunter, who considers a few miles to be a necessary interval for a ship lying to leeward of a swamp, in order to insure a complete exemption from disease.

When malaria proceeds from an apparently dry and rocky coast, as that of Gibraltar, and some parts of the coast of Spain, the poison, though of great intensity, is probably generated in a much smaller quantity than when exhaled from the broad surface of a marsh, so that a less space is a complete security from the attacks of fever. In the epidemics which have of late years so often ravaged the coasts of Spain, the fisherman, living with his family on board his boat, has been rarely attacked, though lying at anchor close in shore. Also, in the late epidemics at Gibraltar, it was not unusual for the richer inhabitants to hire a Moorish vessel during the season of fever, and to live on board, and there was scarcely an instance of their having been affected under such circumstances, though keeping up a free communication, either directly or indirectly with the town. The spread of the paludal miasmata, therefore, over the sea appears to vary from a few hundred to many thousand feet, according to the quantity of miasmata generated.

The extent to which marsh miasmata may spread in a *horizontal direction* from their source over land, is a still more complicated question, on account of the different affinity which either the poison, or the vapour which holds it in solution, has for the many substances over which it passes. These act as so many attracting or repelling causes, tending to limit or extend the spread of the poison. Thus a forest, a given stratum of soil, a line of buildings, may either attract,



turn aside, or repel the miasmata, and thus greatly heighten the conditions of the problem.

The effect of trees in intercepting the paludal poison is remarkable, and appears to have been known to the ancients, who are supposed to have surrounded their temples with groves, on account of their protecting influence. Pope Bennoit XIV, ordered a wood to be cut down which separated Villatri from the Pomptine marshes, and in consequence, for many following years, there raged throughout the whole country, and in places never before attacked, a most severe and fatal fever. The same effects were produced from a similar circumstance, in the environs of Campo Salino. Lancisi states that a forest which extended from the heights of Frascati and of Albano almost to the Tiber, having been felled, this barrier between the Pomptine marshes and the southern parts of Rome being removed, the Campagna di Roma became uninhabitable. In the West Indies, it is quite wonderful how near to the leeward of the most pestiferous marshes, the planter, provided he is protected by trees, will venture, and that with impunity, to place his habitation.

Different soils, also, act as attracting or repelling causes, which affect the transmission of the paludal poison. The spot, for instance, in which the New National Dock and arsenal are built, was a marsh of about seven hundred acres, and on either side of it are the villages of Greenhithe and of Northfleet. The peculiarity in this case is, that the inhabitants of these villages rarely suffered from intermittent fever, whilst those on the hills beyond were greatly afflicted with that disease. Dr. Maton mentions a similar fact in the neighbourhood of Weymouth. The inhabitants of a dry district, immediately around, or on a level with the marsh, being nearly exempted from the fever which greatly prevails on the more distant hills. This same fact is also observed on the hills in Sussex.

The different force by which the paludal poison is attracted by different surfaces, has often been observed in the West Indies. Fort Hildane, at Porto Maria, Jamaica, occupies

the extreme point of a promontory, which projects considerably from the main land, and divides the bay into two basin like recesses. This promontory which is one hundred and fifty feet above the level of the sea, and two hundred feet across, is so nearly perpendicular and so nearly alike in all its faces, that it has the appearance of an artificial structure raised for the defence of the harbour. It is formed of pure carbonate of lime, and looking at it merely as a dry mass of chalk washed on three sides by the sea, we should imagine it to be one of the healthiest situations in the West Indies. Two streams, however, fall into the bay, one on each side of this head-land, at about a quarter of a mile distant. They move slowly, and their banks are covered with mangrove, which it is presumed, furnishes the more palpable cause of fever. But it is remarkable that the inhabitants of Porto Maria, which is situated on either side of one of these streams, do not appear to suffer from their position, while at Fort Hildane the returns of the sick have shewn it to be productive of a fever, so deadly, that for some years past, that fort has not been garrisoned.\*

Port Spain, the capital of the island of Trinidad, is built on low alluvial soil, and situated very near the great eastern marsh, with which it is in direct communication by a marginal line along the shore. It cannot be called a healthy town, but is very far from being uninhabitable. On the right, are some covering heights, which rise out of one extremity of the marsh, and which are composed of the driest and most healthy materials, or pure limestone; yet a residence on them has proved destructive to all who have ventured to inhabit there, for no portion of their diversified surface, however elevated, sunken or walled round, has been a security from the exhalations below.

The preceding facts are sufficient to shew if the altitude to which the paludal poison ascends, greatly varies in different places, that its horizontal spread also varies according to the surface over which it passes, being strongly at-

\* In the year 1817, out of a detachment of fifty-eight men, twenty-four were cut off in nine months at this station.—Arnold on fever, p. 197.



tracted by some bodies, and altogether without affinity for others. In attempting to assign the law which may explain these varying, and often apparently opposite phenomena, there is no hypothesis so satisfactory as that which supposes the diffusion of the paludal poison to follow the same laws as those which govern the vapour or dew, by which it is held either in a state of solution or of suspension, and which may be generalized as follows :—

The earth, immediately after the setting of the sun, begins to radiate or part with the heat it has acquired during the day, and this process is so rapid, that the earth's surface in a short time becomes colder than the atmosphere. The latter, consequently, deprived of a portion of its caloric, deposits the vapour which, during the day, it had held dissolved or suspended, and this condensation or precipitation is the dew. There is a remarkable difference, however, in the rate of cooling of different soils or strata of the earth, and also a still greater difference in the rate of cooling of solid and of fluid bodies, and, consequently, the dew is deposited in different amounts in proportion to the different conducting powers of the bodies over which it passes.

By the law of the greater rate of cooling of solid than of fluid bodies, the fact of the general exemption from paludal disease, in high latitudes, of ships anchored in rivers at a short distance from a swamp, is quite explicable, for the temperature of the air is often lower than that of a large volume of water. Sir Humphrey Davy, for example, on descending the Danube, found that the temperature of the air was  $54^{\circ}$ , while that of the waters of the river was  $62^{\circ}$ . Mr. Harvey, also, who has paid much attention to this subject, has found that when the temperature of the stream supplying Plymouth, was  $53^{\circ}$  all over its surface, that of the air was only  $42^{\circ}$ . It follows, therefore, from the water being of a higher temperature than the air, no dew will be condensed on its surface, but, on the contrary, the more heated water will continue to send up vapour, fuming mists and fogs, and, consequently, the noxious miasmata will not be precipitated—a circumstance which, it is apprehended, must

be considered as the true cause of the healthy state of the crews of our ships riding in the roads of Flushing, while the army on shore, encamped on a colder surface, was nearly annihilated.

The application of the same law will equally explain, why, in tropical countries, the intervention of a much more considerable extent of water than was the case at Flushing will not afford an equal protection. In these climates, the land during the day becomes much more heated by the sun's rays, than the adjacent waters, so that the superincumbent atmosphere, proportionably rarified, is displaced by the colder and denser air of the ocean, and thus *the sea breeze*. Humboldt in his voyage down the Orinoco has observed many remarkable instances of this higher temperature of the land compared with that of the water. Thus in longitude,  $68^{\circ}.17.9'$ . lat.  $5^{\circ}.13'.57''$ , he found the thermometer indicated during the night, from  $80$  to  $84^{\circ}$ , and in the day,  $86^{\circ}$ , while the water of the river, was  $81.7^{\circ}$ , and that of a spring,  $82^{\circ}$ . He found also in the harbours, and along the coasts of Portugal and America, that there was a considerable difference in the temperature of shoal and of deep water. On his passage between the northern cape of the Cayo and the Island of Cuba, when they entered the sea free from breakers, and of a dark-blue colour, he found an increase of temperature indicated a great augmentation of depth, the thermometer standing  $79.2^{\circ}$ , whereas, in the shoal water of the Jardanillos, it had been as low as  $72^{\circ}$  the air being from  $76^{\circ}$  to  $80.6^{\circ}$  during the day. The temperature of the river Mawnanares in the season of the floods, he adds, descends as low as  $71.6^{\circ}$  while that of the air is as high as  $91^{\circ}$ .\* It is plain, therefore, that although the temperature of the sea in tropical countries, is generally above that of the air, that of shallow waters is often considerably below it, and, consequently, when the air blows over them, that dew must be plentifully deposited at their surface, and with it the noxious miasmata it holds in solution, and this at a very considerable distance from the shore.

The different attracting force of various superficial strata

\* Personal narrative.



for the paludal poison is, probably, owing to the different conducting powers of the different substances which compose the solid crust of our earth. Dr. Wells has shown that two portions of soil of different qualities though contiguous, will speedily become of different temperatures after the sun has set; for a thermometer placed on a grass-plot, a gravel-walk, and the bare soil, will all give different degrees of temperature, and dew is found by experience to be deposited according to the inverse ratio of the temperature, or in proportion to the degree of cold produced. It follows, therefore, that dew will be differently attracted or deposited on different soils. This law often gives rise to many curious and beautiful phenomena, for on passing over a plain, on a still evening, consisting partly of green crops and partly of fallow land, it is most curious to see the ground mapped out, by a heavy dew falling on those parts which are covered with vegetation, while over the fallow lands which need no moisture, the air remains perfectly transparent.

In Jamaica and other West India Islands it has been stated that promontories composed of a pure white limestone, and of considerable height, when situated in the neighbourhood of a marsh, are more pestiferous than even the marsh itself. The above law at once resolves this difficulty. "Many soils," says Sir Humphrey Davy,\* "are popularly distinguished as "cold, and the distinction, though at first view it may appear "founded on prejudice, is really just. Some soils are much "more heated by the rays of the sun, all other circumstances "being equal, than others. This property has been very little "attended to in a philosophical point of view, yet it is of the "highest importance in agriculture. I have found that a rich "black mould which contained nearly one-fourth of vegetable "matter had its temperature increased in an hour from 65° to "88° by exposure to the sunshine, whilst a chalk soil was "heated only to 69° under the same circumstances." These facts must be as true in the corresponding soils of Jamaica and other parts of the West Indies as in this country, and it results, that when a country by a revolution of the

\* Agricultural chemistry, p. 155.

earth on its axis has turned from the source of heat, or the sun has set, that the lofty, but white and reflecting, and, consequently, cold promontory, is, by difference of temperature as compared with the alluvial soil, on a level with the marsh, in a state at once to become a powerful condensing body. The dew, therefore, and consequently the noxious miasmata must be deposited upon it in great abundance, so that admitting the rate of cooling of rich vegetable mould to be greater than that of the rock, still many hours must elapse before they acquire the same temperature. The principle, therefore, of different degrees of radiation by different strata readily accounts for the paludal miasmata passing over a given surface while it readily impinges on others more remote.

The greater radiation of heat by vegetable substances as compared with that by the inorganic kingdom, and, consequently, the greater deposition of dew on such spots affords a similar solution of the intervention of a forest between a town and a marsh, giving the inhabitants a complete exemption from paludal disease from that quarter. Indeed, the attraction of trees and forests for dew or vapour is so great, that since the settlement of America, many considerable streams have been totally dried up, in consequence of the felling of the woods in that country. Trees, says White, in his *History of Selborne*, are perfect alembics, and no one that has not attended to such matters can imagine how much one tree will distill in a night. Hales states that a pear-tree which weighed seventy-one pounds absorbed fifteen-pounds of water in six hours.\*

Baglivi says, that in Rome, the healthy spots are separated from the unhealthy by a wonderfully small distance, as a line of houses, and in Sicily, a wall, or a hedge has separated the healthy from the unhealthy district, and the same phenomena has been observed in many parts of the continent. This phenomenon also corresponds with that of dew, which is often seen to be affected in a similar man-

\* The temperature in the interior of the trunk of a tree is nearly that of the soil from which they draw their nourishment.—Thomson on Heat and Electricity, p. 97.



ner, and stopping at a certain limit, either repelled by a higher temperature, or attracted by a more powerful condensing body.

There is another circumstance, also, which seems to identify the laws of progression of marsh miasmata with those of dew, which is, that the former are most dangerous at those times when the latter is most copiously deposited. It is well known that the danger of infection, though not inconsiderable during the day, is a hundred-fold increased after set of sun, and during the night when the dew is fast falling. No stranger, for instance, can stop with impunity during the night on the road through the Pomptine marshes, and the warning given by Lancisi is still repeated to all travellers in Italy, "*neque solum dormientibus noxius est per noctem palustris*" "*aër sed iis etiam qui vigilantes per cænosa loca iter faciunt,*" "*qua de re monitos velim quotquot vel Neapoli Romam vel*" "*Romæ Neapolim contendunt ut diurnos potius æstus sub-*" "*eant quam nocturni frigoris voluptati deceptam contemna-*" "*tam ambientis aëris vim excipiant.*"\* The strongest evidence of the deleterious action of the night air, is, perhaps, afforded by ships touching at tropical ports to water. Dr. Trotter says "that in the Assistance in 1762, in a voyage down the Coast of Guinea, we had scarcely a man indisposed. We wooded and watered at the Island of St. Thomas's, and with a view to expedition, a tent was erected on shore, in which the people employed on that service were lodged during the night. On the middle passage, every man who slept on shore died, while the rest of the crew remained remarkably healthy." The Phoenix, a forty gun ship, which had touched likewise at the same island, lost eight out of ten men, who had imprudently remained on shore during the night, while such part of the crew as returned on board before sun-set, remained perfectly healthy. Similar events are of such common occurrence as to be within the knowledge of every naval officer. All these different series of phenomena, seem to prove that the laws which govern the altitudinal and lateral spread of marsh miasmata, are identical with those

which relate to the deposition of the dew and the capacity of air for vapour, and there can be little doubt as our knowledge of meteorology advances, that every anomaly attending the diffusion of miasmata will admit of a distinct explanation.

If the hypothesis of the miasmata being held in solution by vapour or dew be established, it is probable that a cubic foot of air at the tropics, must contain three or four times the number of those poisonous elements, which exist in it in this country, the increased temperature of the air enabling it to combine with that larger proportionate quantity of vapour. This circumstance renders it questionable whether the severer forms of paludal fever are caused by the greater intensity or the greater quantity of the paludal poison. Mungo Park was of opinion that in Africa, miasmata were so abundant as to be precipitated with the rain; and he states that on one occasion the rain had not begun to descend more than three minutes, before many soldiers seemed drunk and fell asleep, while others vomited. In many tropical countries, the first rains that fall are certainly the most unhealthy, but this fact appears equally explicable, on the ground that the heated, but now softened, earth may permit the escape of the miasmata in sudden and great abundance from its surface. Perhaps, also, they are capable of concentration or accumulation from other causes; as when the vapour is detained amid woods and jungles, where the breeze cannot dissipate it, and the rays of the sun cannot penetrate to dispel them; such districts are, at least, fatal to whoever may venture to approach their precincts.

*Predisposing causes.*—The paludal poison spares no age, for the infant at the breast,\* the adult and the decrepit with age, are alike seen to shake with ague, or to suffer from some severer form of the disease. The adult, however, from his greater exposure to the cause, suffers in the greatest propor-

\* “So common is ague in many parts of Spain and Portugal,” says Sir James Macgrigor, “that the inhabitants do not term it a disease. Infants “at the breast are frequently seen with it.”—*Medico Chir. Trans.*, vol. vi. p. 415.



tion, and the infant for the opposite reason, the least. It has generally been thought that on attaining adult age, the liability to paludal disease, decreased with advance of years. The experience, however, of the army in the West Indies, and at every station, tropical, or temperate, from which reports have been obtained, shows that the exposure being equal, the mortality from paludal fevers is increased in a direct ratio to age, so that the superiority of veteran soldiers over young recruits in the endurance of fatigue, and those numberless hardships to which they are exposed on actual service is counteracted by their increased susceptibility to the action of this poison. The following table demonstrates the greater annual mortality, per 1000, with increasing ages.

Ages .....	18 to 25	25 to 33	33 to 40	40 to 50
In civil life in England by Carlisle tables .....	7	8 . 9	10 . 7	14 . 1
Among troops in the windward and leeward command. . .	50	74	97	123
Among troops in the Jamaica command . . . . .	70	107	131	128

Difference of *sex* appears, also, to affect the liability to this class of disease. In the West Indies, in civil life, a woman is esteemed twice as good a life as a man—arising, probably from their more temperate habits, and different degrees of exposure to the night air. In barracks, the same difference of liability is observed between the sexes; “but during the war,” says Dr. John Hunter, “when the wives of the common soldiers were equally exposed with their husbands, they suffered in the same proportion.” The following tables are the nearest approximation to their relative liability in civil life, which we possess, and are the proportions which occurred in the epidemic, at Gibraltar, in 1828, among the inhabitants:—

Men .....	684.
Women .....	286.
Children .....	200.

It appears, also, that difference of *race* greatly influences

the liability to paludal diseases and fever, the great source of inefficiency among the white troops is comparatively rare among the black troops. The average mortality among the white troops being 36.9 per 1000 mean strength, while among the black troops, it is only 4.6 per 1000 mean strength.\* “Among the civil inhabitants of Jamaica, the negro race,” says Dr. Arnold, “are very seldom attacked, but the mixed “races, if they approximate to the habits and manners of “Europeans, are not exempt; and altogether, the natives or “creoles are much less subject to paludal fever than stran- “gers.”

It has been shewn that the duration of human life, even in the natives of a paludal district is much abridged, compared with that of the inhabitants of a higher country and more healthy soil. The history, however, of every expedition undertaken by this, or any other nation, into a paludal country, has proved that the native inhabitant is much less affected by the noxious atmosphere, than the invader. The invasions of Holland, of the Burmes<sup>†</sup> and of the African empires, has, in each instance, been so disastrous to the troops, that the whole force must have perished from this class of disease in a few months, but for the success of their arms

\* WINDWARD AND LEEWARD COMMAND.

Annual mor- tality per 1000 of fever.	British Guiana,	Trinidad.	Tobago.	Grenada	St. Vincent.	Barbadoes.	St. Lucia.	Dominica.	Antigua, &c.	St. Kitt's, &c.	Average of wind- ward and lee- ward command
White troops	59.2	61.6	104.3	26.3	11.2	11.8	63.1	49.3	14.9	42.1	36.9
Black troops	8.5	3.2	8.6	4.8	.9	3.8	5.2	7.7	1.7	10.5	4.6

From this table, it appears that fever, particularly of the intermittent type, which proves the great source of inefficiency among the white troops, exerts comparatively little influence among the black troops.

† The fleet anchored in Rangoon River on the 10th of May, when the troops mustered between 5,000 to 6,000 men, by the end of June, fever had so diminished the number, that even after re-inforcements, scarcely 3,000 troops were left to guard the line. After the fall of the rains in October, when the ground was covered with sheets of stagnant water, and the air loaded with noxious vapours, the sickness and deaths became greater, even than at any previous time.



in the one instance, or their being withdrawn from the pestilent atmosphere in the other.

The different habits of life incident to different grades of society, appear also to influence the liability to paludal fevers. The officer, for instance, is only half as liable to be attacked by paludal fevers, generally, as the soldier, but when attacked the disease has proved more fatal. In Jamaica, during the last eighteen years, one in five has died among the officers attacked, while among the soldiers, only one in eight of those attacked has fallen. In the windward and leeward command, three-fourths of the officers attacked by yellow fever have died, while among the soldiers attacked, only three-tenths have fallen from the same cause. The aggravated character which this class of disease assumes among the officers is a fact often commented on in the medical reports.

Crowded ill-ventilated habitations appear sensibly to influence the liability to paludal fevers. The extent of barrack accommodation to the soldiers serving in the windward and leeward command, did not, prior to 1827, exceed from twenty to twenty-three inches in breadth to each person, and as this limited space would not admit of bedsteads, hammocks were substituted, by which expedient, as many men were placed in one apartment as the breadth of their bodies would admit, giving not more than from 200 to 311 cubic feet to each man. About the year 1827, however, iron bedsteads were introduced, and the breadth allowed to each person increased to three feet three inches, so that the space which had been allotted to 344 men, was now divided among 222 affording 350 to 400 cubic feet to each man. Under this improved accommodation, the health of the soldiers improved, so that the number of deaths for six years, prior to and including 1827, was to the number of deaths for the six years from 1831 to 1836 in the diminished ratio of six to seven. It has also been remarked, that when the yellow fever has been epidemic at Gibraltar, Seville, Cadiz, and other cities on the coasts of Spain, that the proportionate numbers affected have been greatest in the most densely populated districts.

It has been affirmed that persons of regular habits are not

more exempted from attack, during the prevalence of an epidemic yellow fever, than the more dissolute and intemperate. This, perhaps, is correct, when the poison is of more than ordinary intensity, but taking the average of years, the immunity is certainly greatly in favour of the temperate and prudent. In the West Indies, it is observed, that those who habitually indulge in excesses, are accustomed to lay down and sleep in the open air, both during the heat of the day and at the close of the evening when the dew begins to fall, most frequently suffer from fever, and it is to these causes, perhaps, that the soldier is so much more liable to attack than his officer. When on actual service, the soldier is necessarily exposed to wet, to intemperance, and to all the accidents incident to the field, and when acting in the West Indies, the mortality under these circumstances has been enormous. A most striking instance of this occurred during the late war, for not one sixth part of the French troops sent to St. Domingo survived the first twelvemonth. In Jamaica, also, owing to an insurrection of the negroes in the north and east of the island, in the beginning of 1832, it became necessary for the protection of the inhabitants to send out a number of small detachments, which were not withdrawn till last year. The sickness and mortality were such that, according to Dr. Arnold,\* the whole of the troops thus employed must have been cut off in less than two years; and all this mortality occurred at a time when the island enjoyed a more than usual degree of salubrity. "Even when not on active service, every species of intemperance," says the same authority, "cannot be too rigidly forbidden; persons addicted to ardent spirits suffer considerably more than persons of temperate habits."

In the East Indies, the difference of habits, including, perhaps, the advantage of being acclimatée, makes a considerable difference in the liability of the native, and of the European soldier to paludal fever. Thus it appears by the returns of the Madras force for 1821, that out of 9553 Europeans, 3442

\* P. 204.



laboured under these forms of disease, or one in three nearly, while of 82.046 sepoy, only 18.165 were attacked, or in the ratio of not more than one in four and a half. It appears, also, that of those attacked, the European dies in a larger proportion than the sepoy, the former losing seven per cent. the latter only six per cent.

It has been stated that the season of the year in which the greatest degree of heat is combined with the greatest degree of moisture, is the period of greatest liability to paludal fever, or between August and December. This law is not confined to the West Indies, but extends to the East Indies, as well as over a large portion of the northern temperate zone. In the Mediterranean stations particularly, the admissions into hospitals and deaths, average nearly twice as high between July and October\* as during any similar number of months in the year; and in Canada, the same peculiarity is observable as to season, though not to the same degree, on account of the severe frosts which set in early in October. In this country the disease is generally contracted in the summer and autumn, though its long periods of latency often delay its appearance till winter. In the stations to the south of the equator, that period of the year which in the north of the line is most unhealthy, becomes in the south the most salubrious, in consequence of the seasons being reversed. The following tables of the deaths by the fever in Jamaica and in Canada, will best exemplify this statement.

Deaths in Eighteen years among the troops  
in the Jamaica command.

Eighteen	Januarys	. .	559
„	Februarys	. .	351
„	Marches	. .	291
„	Aprils	. .	262
„	Mays	. .	286
„	Junes	. .	323
„	Julys	. .	427
„	Augusts	. .	786
„	Septembers	. .	515
„	Octobers	. .	640
„	Novembers	. .	801
„	Decembers	. .	725

Deaths in Twenty years among the troops  
in Canada.

Twenty	Januarys	. .	76
„	Februarys	. .	57
„	Marches	. .	75
„	Aprils	. .	73
„	Mays	. .	64
„	Junes	. .	104
„	Julys	. .	90
„	Augusts	. .	128
„	Septembers	. .	82
„	Octobers	. .	71
„	Novembers	. .	62
„	Decembers	. .	61

\* In the parts of Spain and Portugal where remittent and intermittent

At Gibraltar, the epidemic in 1828, first broke out in September, and cases were reported till the second week in January; and both in 1813 and in 1828, the epidemic attained its maximum on the 16th of October, and in 1804, about a month earlier.

There is period of the day as well as of the year, which is the most unhealthy. It is evident that the exhalation of the miasmata must be greater during the heat of the day than at any other time; but being combined with vapour and volatilized, they ascend into the higher regions of the atmosphere and are quickly dispersed. The most healthy period in the twenty-four hours is from three to six in the afternoon, or after the greatest heat of the day is past, and before the dew begins to fall.

*Susceptibility not exhausted.*—There is no axiom, likewise, more generally received in medicine, than that a long residence in a paludal country (*acclimaté*) destroys all susceptibility to the action of the paludal poison; but the returns, published by the war office and the army medical department, painfully shew a contrary result in the West Indies. Thus,\* while the annual mortality among the troops resident in Jamaica one year, was seventy-seven per thousand mean strength—in those resident two years, it increased to eighty-seven per thousand, while in those still longer resident in the island, it has averaged no less than ninety-three per thousand. However, in civil life, Dr. Arnold is of opinion that when strangers have been long resident in the West Indies, and lost their European constitution, that they are less liable to paludal fever.

Many facts seem distinctly to prove that a person passing from a country of greater to one of less malignity, enjoys a temporary exemption from paludal diseases, which he loses on passing from one of less to one of greater virulence. The fevers are endemic, the sickly season is from July to September. “It was very remarkable,” says Sir James Macgrigor, “how unkindly and severely the rainy weather in October operated on many debilitated cases, whose constitutions had been worn down by repeated attacks of fever, joined with bowel complaints. Many of these were suddenly carried off, several in the course of a few hours.”—*Medico Chir. Trans.* vol. vi, p. 387.

\* P. 89.



African black, for instance, habituated to his native pestiferous swamps, and living in a temperature, averaging, at least,  $84^{\circ}$ , suffers little from fever on being transported to the West Indies, a climate of lower temperature and of less fatality. On the attempt, however, to colonize Sierra Leone by blacks from Jamaica, a considerable number of them were seized with fever, and many died, though in a less proportion than the white troops. During the French revolutionary wars, also, many refugees from the West India islands sought protection in the southern states of America, and entirely escaped the effects of the epidemic, which was raging on their first landing ; but after a residence of three or four years, they were often attacked. The exemption from the action of the paludal poison by constant exposure to it, is exactly similar to the power, acquired by habit, of resisting opium, ardent spirits, tobacco, and many other deleterious agents, and, it is also well known, that by abstaining from these substances, the susceptibility to their actions is increased.

It has been imagined by many writers that one attack of paludal fever gives an immunity from the future actions of the poison, and more especially from that producing yellow fever. In Spain, where yellow fever is supposed to be contagious, an opinion prevails that the same individual is not liable to be attacked a second time ; “and this “opinion,” says Dr. Arejula, “was so general, that I ventured to publish and affirm by notices affixed in the “streets, that whosoever has suffered the epidemic malady “on the present occasion (1804), or in the year 1800, or has “been a long time in South America, is exempt from this “disease, even as one who has had the small-pox.” There is too much reason, however, to dispute this assertion, for Humboldt says a second attack in the United States is not uncommon. Dr. Gillkrest\* says relapses are very common in Gibraltar, so that in 1828, one hundred and two cases occurred among the military alone. Dr. Bancroft, says,† of eight gentlemen who have filled the office of inspector of Naval Hos-

\* Cyclopedia of Practical Medicine, part ix, p. 280.

† Sequel to Essay on Yellow Fever, p. 697.

pitals, or that of physician to the fleet, or both, *all* either attest their knowledge or their belief of the frequent occurrence of second attacks. In the able report of Major Tulloch, it is stated that in the West Indies and in the west coast of Africa, one attack of remittent fever secures no immunity from a second. Indeed, it could be proved by reference to the returns from those stations, that in many corps, every soldier must have been treated, on the average, twice or thrice for remittent fever during the few years of his service there.

“ In the West Indies,” says this gentleman,\* “ one attack  
 “ of the remittent fever of this country, secures no immunity  
 “ from a second; so far from that, the returns show that seventy-  
 “ five out of every hundred have been under treatment for it  
 “ annually; that is, each man, whether resident for a long or a  
 “ short period in the climate, has had an attack every sixteen  
 “ months. Intermittents are principally confined to the winter  
 “ and spring months when there is a considerable degree of  
 “ humidity in the atmosphere. This is not, however, with-  
 “ out exceptions, as in some corps, intermittent fevers have  
 “ occasionally been as prevalent throughout the summer as  
 “ during the winter. It is stated by the medical officers,  
 “ that those who have had remittent fever in the summer,  
 “ are particularly liable to intermittent in the winter, even if  
 “ they have removed to a station where the latter is other-  
 “ wise rare. For instance, after the removal of the 7th Fu-  
 “ sileers to Malta, in 1828, almost every individual who had  
 “ suffered from remittent in the Ionian Islands, was attacked  
 “ by intermittent.”†

Patients who have suffered from the milder forms of paludal fever unquestionably afford no exemption, “ for in the Peninsu-  
 “ lar war, in making calculation of efficient force,” says Sir James Macgrigor, “ this description of men could not be de-  
 “ pended on for operations long continued in the field,” for,  
 “ after effluvia from marshes or the exhalation raised by a  
 “ powerful sun acting on a humid luxuriant soil, we found that

\* P. 46.

† Tulloch's Statistical Reports in the Mediterranean, p. 340.



“in those who were convalescent or lately recovered from  
“ague, the causes next in power to re-produce the disease, were  
“exposure to a shower of rain or wetting the feet, exposure to  
“the direct solar rays or to cold, with intemperance and irre-  
“gularity or great fatigue. Many other causes would excite  
“the disease in the predisposed, but these never failed to do  
“so.” On the return of the troops from Walcheren, the relapses were numerous, and continued to recur for many months.

*Co-exists.*—This law of paludal diseases has not been sufficiently studied. Heberden has spoken of the co-existence of small-pox and of intermittent fever; and the latter is often seen combined with scabies, and there can be no doubt of the simultaneous existence of the paludal with many other poisons.

*Modes of absorption.*—It is apprehended the paludal miasmata are, in all cases, absorbed by the mucous membranes, either of the lungs or of the alimentary canal, and being absorbed that they mingle with the blood. The following affection of the foetus in utero, seems to demonstrate this fact. “In the month of June,” says Dr. Russel, “a strong  
“and healthy woman, at Aleppo, already mother of two  
“children, and then in the seventh month of her third pregnancy, was attacked with tertian fever. The fits returned  
“regularly about noon, and terminated in less than ten hours  
“by a profuse sweat; but it was remarkable in this case that  
“the foetus seemed to suffer a paroxysm perceptibly distinct  
“from that of the mother. About eight o’clock in the morning, the woman felt the child—as she expresses it—tremble  
“with great violence, and she was sensible of a sudden coldness of the womb. The coldness went off in less than  
“fifteen minutes, and was succeeded for more than an hour  
“by a glowing heat, during which, the child was at intervals  
“somewhat restless. While this happened to the child, the  
“mother remained well, her pulse was not altered, she only  
“complained of lassitude and a dull pain of the forehead,  
“the usual forerunners of the paroxysm. The same circumstance invariably attended every fit till the eleventh  
“day of the disease, when she was cured by bark.”

*Period of latency.*—The period of time, after exposure to the cause, that the poison may lie latent, varies according to its intensity and the state of the recipient. In the West Indies, and in other tropical countries, the period of latency is usually short. Dr. Jackson states that a detachment of Dutch artillery, consisting of ninety-six men, arrived at Port-au-Prince, St. Domingo, in the beginning of August; the detachment had not experienced any sickness during the voyage from England, so that whatever disease occurred, might justly be attributed to climate. On the night after landing, eight men were brought to the hospital, seven ill of fever. More generally, however, even near the equator, the interval is from three, four or five days to a fortnight.

In more temperate climates, the period of latency is usually much longer. The minimum of time may, perhaps, be as short as that in the West Indies; but more commonly, the poison lies latent for many weeks, and sometimes for many months. Our troops, during the Walcheren expedition, suffered immensely from intermittent and remittent fever. On their return, however, to this country, great care was taken to quarter them in situations remote from all known sources of marsh miasmata, yet fresh cases continued to occur as late as five, six, eight, nine and even ten months afterwards. The period of time, therefore, that the paludal poison may lie latent, varies from a few hours to ten or even twelve months.

A knowledge of the distant period the paludal poison may lie latent, explains many facts otherwise of difficult solution. We are perpetually, for instance, receiving into our hospitals, both in winter and early in the spring, patients labouring under intermittent fever—seasons, when the temperature of the atmosphere is so low as to render vegetable decomposition almost impossible. It seems probable, therefore, that the vernal intermittent must result from marsh miasmata received into the system during the preceding summer or autumn, and which has remained dormant in the system till some predisposing circumstance has roused it into action.



*Pathology.*—The theory of this disease is that the paludal poison is absorbed, and infects the blood, and after a period of latency more or less long, produces, according to the dose, functional disorders of the great nervous centres, terminating in the phenomena of intermittent, remittent, and of that peculiar form of remittent termed yellow fever. Many hypotheses have been suggested to account for the phenomena of periodic fever, as being more remarkable than those of continued fever; but it will be plain that continued fever is more remarkable than intermittent fever, and a greater deviation from the ordinary laws of the human economy, for every function incident to our being is intermittent, as sleep, hunger, sexual desire, muscular action, and almost every evacuation. Even continued fever, very constantly begins with slight paroxysms of an intermittent character. The periodic intermission or remission, therefore, has little that ought to excite our surprise. Fever of a peculiar character being thus set up, the patient is often destroyed in a few hours by the severer forms of the disease, without any trace of altered structure of any organ or tissue of the body. In the milder forms of the disease, however, the poison produces alterations of structure in a greater number of tissues and organs of the body than result from the action of almost any other poison. Thus, posthumous examination shows that intermittent and mild remittent fevers are often accompanied with diseases of the liver, spleen, lungs, brain, heart, and of the serous, mucous and cellular tissues of the body generally. The law of the paludal poison, therefore, is that its specific actions are generally in the inverse ratio of the intensity of the disease; for in yellow fever, the patient is usually destroyed by the violence of the febrile actions, before the poison has had time to set up its local actions. The greatest amount of structural disease, therefore, results from a medium or a minimum dose of the poison, and more especially from the latter.

A minimum dose of the paludal poison, when introduced into the system, gives rise to intermittent fever of less than twelve hours' continuance, and which returns at regular but short periods, as twenty-four, forty-eight, or seventy-two

hours, according to the nature of the type; the interval between each paroxysm being a state of complete apyrexia. This derangement of function the human frame is capable of sustaining for a considerable time, and is, in the present day, usually cured without any organic lesion taking place. When, however, the disease is of such intensity, or is so neglected that secondary actions are set up, these vary according to certain unknown modifications of the poison, probably impressed by the nature of the soil in which the miasmata are generated. “In the Rangoon expedition,” says Mr. Walsh, “the liver was so altered in colour and so gorged with blood, as scarcely to bear handling or pressure. The fevers of the jungle of the Wynaad have been as violent as these, yet the viscus that mostly suffered was the spleen.” Mr. Annesley also states: \* “In the southern and drier provinces of India, fevers assume more frequently continued remittent and inflammatory forms, especially amongst recent comers to the country; and determination of blood to the head and liver is oftener present in them than in the fevers of the northern countries of the empire. On the other hand, intermittents with congestion of the spleen or affections of the thoracic viscera, are more frequent in the districts under the Bengal and Bombay presidencies than in those belonging to Madras.” And a similar diversity of actions of the poison has been observed in the different districts and countries of Europe. The secondary actions of the paludal poison, thus modified by local circumstances, are consequently not an uniform series. In this country, the opportunities for posthumous examination after intermittent fever, are but rare; † but in London, the liver, the spleen and the peritoneum, are the organs found most usually diseased, and these affections may take place either conjointly or separately, and according to any order of the series.

\* Sketches of diseases of India, p. 346.

† In the Peninsular War, 291 cases are reported to have died of intermittent fever. The spleen and the liver were most frequently diseased:—“But,” says Sir James Macgrigor, “the only two of which I can find dissection reports, were both at Cintra.”



When the poison falls upon the liver, it may occasion merely disordered function of this organ, as jaundice, or it may produce inflammation of the liver, of which jaundice may or may not be a symptom. The inflammation of the liver may be acute or chronic, and it may be diffusely inflamed or take on suppuration. If the liver has been previously healthy and becomes the seat of diffuse inflammation, it is of the deepest hepatic tint, loaded with blood, and so hypertrophied that it often weighs many pounds, and fills the greater portion of the abdominal and pelvic cavities. Its texture is, also, most easily broken down when the disease is acute, but is hardened when it is chronic. In a few instances this inflammation may terminate in abscess. On the contrary, if the liver has been previously diseased, its colour, even when acutely inflamed, may be of the palest yellow, and its consistency sometimes so soft that the blood-vessels may be dissected out by the fingers, while at other times it is so hard as to resemble a muscular mass. In size, also, it varies from a small shapeless lump to a magnitude as great as in the former variety. These pale livers sometimes run likewise into a state of suppuration; and in a case of this kind, which occurred in St. Thomas's Hospital, the abscess had burst into the duodenum.

We are unacquainted with the healthy functions of the spleen, and, consequently, with their derangements, but the paludal poison often produces structural alteration of this viscus. In these cases, its size and consistency are often as various as those of the liver; for it has been found to vary from a morbid degree of softness, little removed from a state of fluidity, to an indurated substance with a distinct hard edge. In size it also greatly varies, being sometimes diminished, but more commonly enlarged or hypertrophied, and occupying as large a portion of the abdominal and pelvic cavities as the most enlarged liver. Its colour is, in these cases, generally darker than usual, and its substance is also the occasional seat of abscess.

When the poison falls on the peritoneum, its functions may be alone deranged, so as to produce ascites, and in this

case there is usually anasarca of the lower extremities. Every form of peritoneal inflammation, also, as the diffuse, the serous, the adhesive, or the purulent, may accompany the ascites, and these forms may be either acute or chronic, and may exist either separately or conjointly.

These are the most usual alterations of function and of structure in the mild paludal fevers seen in London in the present day; and in estimating the relative frequency of these secondary affections, ascites is the most common, then jaundice; while peritonitis, hepatitis and splenitis are less frequent, and occur, perhaps, in nearly equal proportions.

The pathological phenomena which a medium dose of the poison produces, or of that which gives rise to severe intermittent or mild remittent fever are much more extensive. Sir Gilbert Blane, in his observations on the Walcheren fever, remarks that its functional derangements differed from those of the intermittent of this country, principally by the high degree of heat, by a greater degree of delirium, by the excessive secretion of bile, and by the want of distinct intermissions; while the structural differences were the more frequent swellings of the liver and spleen, these taking place in a very few weeks, which in England seldom take place except under a long continuance of the disease, or after frequent relapses. The morbid anatomy, however, of the Walcheren fever, as collected from the different writers who witnessed the disease, is as follows:—

In the Walcheren fever, the liver was, for the most part, enlarged, and of a dark purple colour, and greatly loaded with blood. It was frequently hard, but sometimes so soft as to be almost of a gelatinous consistency. But whether hard or soft, it was usually of great size, exceedingly prominent on the right side, and frequently extending nearly all over the abdomen; it was also the occasional seat of abscess. The gall bladder was generally distended with bile, and the bile, in the earlier stages of the disease, was of a deep green or dark brown colour; but in more protracted cases, it assumed the appearance, both as to consistency and as to colour, of tar. This tar-like fluid when tasted, was found to have lost its bitter flavour, and when mixed with water, did



not impart any yellowness to it, and was often so acrid as to excoriate the lip. The mucous membrane of the gall-bladder was also frequently observed to be inflamed and ulcerated, the ulcer sometimes assuming the conical or tubercular form, sometimes observed in dysentery. Tubercles and hydatids were likewise occasionally met with in the liver, but not so frequently as to warrant the conclusion that they were the result of the action of the poison.

Perhaps the spleen was affected even more frequently than the liver. This viscus was always enlarged. Its usual weight, in a healthy person, is from six to eight ounces, but now it frequently reached three, four, five, and even six pounds. In a few cases, it was hard, more generally, however, soft, and sometimes so broken down as to be little more than a bag of blood. An instance is given of two convalescents, after their return to England, disputing in their ward and proceeding to blows, when one having fallen, his adversary was observed to kick him. The beaten man, however, got up, went to his birth, but in a few minutes expired. The body was examined, when several ounces of blood were found effused into the abdomen, caused by the bursting of an enlarged and extremely soft spleen—the wound or rupture being about an inch and a half long. Abscess of the spleen was, likewise, common, and it has sometimes burst into the cavity of the chest, abdomen or other part. The lienteric mass was also sometimes found in a state of complete ulceration.

The mucous membrane of the stomach was, for the most part, natural, but in a few instances, inflamed and ulcerated, and the ulcers had generally a sharp perpendicular edge, as if made by a punch, while the mucous membrane around them was either natural or but slightly inflamed. In such patients as died dysenteric, the large intestines, and more particularly, the sigmoid flexure and the rectum, were always much contracted, thickened, inflamed and ulcerated. The disease seemed to be of the greatest intensity near the rectum, and the ulcers were often so numerous and so confluent, that the whole inner surface of the gut appeared in a state of granulation. This inflammation frequently extended

to the cœcum and small intestines. The contents of the colon, for the most part, were only blood or a bloody mucus, occasionally a little fœcal matter, and more rarely scybalæ.

The peritoneum was very generally diseased, especially that portion which covers the different organs, caused by extension of the morbid irritability of those parts, or by a specific action of the poison, and from this circumstance, the different viscera often adhered to each other, or to the walls of the abdomen. Sometimes, also, it happened that an encysted abscess formed between the adherent surfaces. When inflammation of the peritoneum existed, it often assumed every different form to which that membrane is liable, as the diffuse, the serous, the adhesive and the purulent, the intestines often floating in serum or pus, or else being glued together. In dropsical and dysenteric cases, the peritoneum was usually thickened, while abscess occasionally formed in the folds of the mesentery.

The serous membranes of the chest were, also, frequently the seat of disease. Sometimes a dropsical effusion filled the cavity—in other cases, the pleura pulmonalis was almost universally adherent to the pleura costalis, while in others, the whole surface of the membrane was covered with recently effused coagulable lymph. When serous effusion took place, it was, in a few instances, so sudden and rapid as to cause almost instant death. “I was present,” says Mr. Hamilton, “at three of these afflicting scenes. In one, while conversing with my patient, I saw him rise out of bed, place himself on the close stool, and expire in a few minutes. On another occasion, a robust athletic man was seized with a violent paroxysm of ague, when his respiration became so difficult and hurried, that he was obliged to sit up in bed, spoke frequently, said he should die, and with these words in his mouth, he expired.” On examining this patient, a large quantity of water was found in the thorax. In the third patient, an universal anasarca attacked him, and so quickly, that he died in a few hours. But the most remarkable circumstance was occasional dropsical effusion into the



cellular tissue around the epiglottis, which became swollen and formed a large tumour as big as a turkey's egg, completely closing up the rima glottidis, so that the patient died suffocated. The epiglottis, also, in some cases, was found ulcerated and thickened. Bronchitis and laryngitis were not unfrequent, while the substance of the lungs was sometimes the seat of severe inflammation, terminating either in the grey or red hepatization, or with effusion of serum.

The heart itself did not always escape the inroads of this destructive poison, for the pericardium was frequently found inflamed and covered with lymph, or else the seat of serous effusion. It was even seen ulcerated, and its adipose membrane oedematous.

The membranes of the brain, also, were often the seat of much inflammation, lymph or serum being often effused between them, while much water was, also, occasionally found in the ventricles. The substance of the brain, likewise, especially in the dropsical cases, was so soft as hardly to bear the knife. Such are the destructive effects of a medium dose of paludal poison.

The maximum dose of the paludal poison producing the several forms of remittent and of yellow fever does not occasion the same amount of disorganization. In this respect, the paludal miasmata follows the great law of poisons generally, or the dose being in excess, the patient falls before sufficient time has elapsed for the poison to set up its specific actions. "In other cases of Wynaad fever," says Mr. Walsh, "though black vomit, and yellowness of the eyes " was frequent, and they terminated fatally in four or five " days, there was scarcely any vestige of local injury or disor- " ganization." Mr. Amiel also affirms, "that the rapid pro- " gress, and short duration of the Gibraltar fever, left no " time for visceral obstructions to be formed." Dr. Gillkrest, says, "the most careful examinations at Gibraltar in " 1828, fully bear out those observers in America, the West " Indies and Spain, who deny, not only, that gangrene of the

“stomach does take place, but also, that any lesion whatever of the stomach is to be traced. As the same may be said, very confidently, with respect to the other parts of the body, it would be unprofitable to enter more into details on this part of the subject.”

As a general principle in all countries in which remittent fever is not of the highest degree of intensity, so that secondary actions have time to form, the only organs usually affected, either in function or structure are the stomach, the brain, and liver. In these cases, the pyloric orifice of the stomach is the part most usually inflamed, the mucous membrane being easily detached, and sometimes ulcerated. The contents of the stomach, also, are either a viscid mucus, or that black melanic matter which is sometimes thrown up by vomiting, or else pure blood. In sevenths of those examined during the epidemic yellow fever at Barcelona in 1821, the stomach contained melanic matter resembling coffee grounds or soot mixed with water, while in one-eighth, it contained pure blood. The duodenum and small intestines, in general, participated with the inflammation of the stomach, and this inflammation extended, not unfrequently, to the gall bladder. The more remote, however, from the stomach, the less the inflammation, so that there was rarely any inflammation of the large intestines. The small intestines were also often filled with the same matters as the stomach, but more viscid, thicker, and more resembling tar, and in the larger intestines, sometimes, these matters were mixed with clotted blood. The liver and spleen were, with few exceptions, without alteration of structure. The brain, also, was found healthy, and the membranes only occasionally inflamed with the usual serous effusion.\*

\* Before quitting the subject of morbid appearances, it may be stated, that a very remarkable occurrence presented itself in a few instances during the last Gibraltar epidemic, or says Dr. Gillkrest, (p. 477) “the infiltration of venous blood in the most uniform manner possible into the cellular tissue of the minutest fibres of the muscles. The whole substance of the muscles which appeared almost black, seemed one soft mass, which yielded to pressure between the fingers as readily as the spleen.



The truth of these observations cannot be better shown than by quoting the result of the posthumous examinations made by Louis in the yellow fever, which raged at Gibraltar in 1828. The French government, desirous of information respecting the origin and mode of propagation of this epidemic, appointed a commission of physicians, composed of Drs. Chervin, Trousseau and Louis, to proceed to Gibraltar and collect such facts as might lead to the solution of the problem. The commission left Paris the 1st of November, and arrived at Gibraltar the 22nd of the same month, thirty-three days before the termination of the epidemic, and as many autopsies were made as circumstances and the advanced period of the epidemic permitted. Messrs. Trousseau and Louis alternately held the pen and the scalpel. The admitted accuracy of the latter great pathologist render these observations of great value.

“ In the cases where we found an effusion of serum in the  
“ arachnoid cavity, or in the lateral ventricles of the brain, or  
“ in the sub-arachnoid tissue, the quantity of it was incon-  
“ siderable.

“ The œsophagus was completely deprived of epidermis  
“ through its whole length, in a third part of the cases, and  
“ partially so in a great number.

“ The stomach was larger than natural in seven subjects,  
“ smaller than usual in three. It contained a clear or dark  
“ red-coloured liquid, a blackish or perfectly black fluid, in  
“ different quantities, in three-fourths of the cases. Its mu-  
“ cous membrane was red through a greater or less extent in  
“ six cases, rose-coloured or orange in eight cases, greyish,  
“ yellowish or whitish in the others. It was thickened  
“ through a greater or less extent of surface in half the cases ;

“ The blood thrown out was grumous, so that incisions caused but little  
“ exudation from the part, no putrid odour or appearance of sloughing.  
“ In one case this infiltration took place into the whole of the muscles of  
“ the right thigh, the abductors excepted, from their origin to their inser-  
“ tion, in another the parts involved, were the gastrocnemii of the left leg,  
“ and flexors of the right arm, in a third case, precisely half the diaphragm  
“ was found in this state.”

“ softened and yellow to an extreme degree in the same  
“ number ; at the same time, thickened, softened and red  
“ in a third part of the cases, mamelonated in two-thirds,  
“ ulcerated in two cases. It was natural in five cases.

“ The mucous membrane was red in a little more than  
“ half the cases, softened in the same number, and thickened  
“ in one case.

“ The small intestine contained a greater or less quantity  
“ of reddish, brownish, blackish, or perfectly black matter in  
“ two thirds of the cases. Its mucous membrane was  
“ slightly injected or red, in spaces, in little more than half  
“ the cases. Its consistence was more or less diminished  
“ through its whole length, or through a part of its extent  
“ only, in rather a greater number of cases. It was particu-  
“ larly thickened in one case ; in no case was it ulcerated ;  
“ and Peyer’s glands were always natural.

“ The large intestine was of a greater size than natural in  
“ two cases. In fifteen cases it contained a matter of a wine  
“ lees colour, or blackish, or brownish, or chocolate coloured,  
“ or entirely black. Its mucous membrane was of a pale or  
“ bright red colour in five cases, greyish, yellowish or whitish  
“ in the others. Its consistence was more or less diminished  
“ in three quarters of the subjects. Its thickness was in-  
“ creased in three cases, and twice we found it slightly ulce-  
“ rated.

“ The mesenteric glands presented traces of inflammation  
“ in four cases, the cervical glands in one case ; in another,  
“ one of the glands about the biliary ducts was red, softened  
“ and very large.

“ The liver was of greater size than natural in two cases,  
“ a little firmer than natural in three cases, a little less firm  
“ in three others. Its cohesion was increased in six cases,  
“ diminished in seven. Its colour was altered in every case ;  
“ sometimes it was the colour of *fresh butter*, sometimes of a  
“ straw yellow, a clear coffee and milk colour, sometimes a  
“ gum yellow, sometimes an orange colour.

“ The spleen was softened in eight cases, and to a mode-



“ rate degree in all, with one exception. It was larger than  
“ usual in five cases.

“ The lesions which we have thus placed before the reader,  
“ were rarely considerable, very often insufficient to explain  
“ the death, and when this explanation was afforded, it was  
“ by a combination of several lesions.

“ The lesions may be divided into two classes, some of  
“ them peculiar, or almost exclusively peculiar to subjects  
“ dying of the yellow fever, others common to those subjects,  
“ and to subjects who have died of other acute diseases.  
“ The red or black matter found in the alimentary canal,  
“ and the remarkable alteration of the liver are of the first  
“ class, all the other lesions of the second.

“ The red or black matter of the stomach and intestines  
“ not having been found in all the cases of yellow fever, it  
“ cannot be considered an anatomical character of that disease.  
“ But it is not so with the alteration of the liver, which was  
“ more or less, exactly the same in all the cases, and which,  
“ for that reason, ought to be considered as the essential  
“ anatomical character of the yellow fever of Gibraltar of  
“ 1828.

“ Amongst the lesions of the second class, the yellowness  
“ of the skin, and the inflammation of the mucous membrane  
“ of the stomach, should be especially remarked, as well from  
“ their frequency as on account of the rapidity with which they  
“ come on. The inflammation of the mucous membrane of  
“ the stomach not having taken place in all cases, and Peyer’s  
“ glands not having ceased to be natural, it follows, on the  
“ one hand, that it is not a gastritis, and on the other hand,  
“ that it is not a typhus fever.\*

“ Having already remarked several times,† at the close of  
“ the preceding observations (cases) that it was by no means  
“ always possible to explain the death of those who fell vic-  
“ tims to the yellow fever of Gibraltar by means of the con-  
“ dition of their organs, I have now to point out the propor-

\* P. 158 to 164.

† P. 143.

“ tions in which this is the case. There are, however, real  
“ difficulties in an attempt of this sort, and in some cases  
“ there is even uncertainty. Lesions, apparently slight, may  
“ explain the death when they have taken place rapidly, as  
“ in the cases now under consideration. And then again, in  
“ the present state of science, we cannot appreciate the na-  
“ ture of the specific lesion of the liver, and, consequently, we  
“ cannot determine how far it had anything to do with the  
“ death. I shall have regard to these two circumstances in  
“ my investigation of the causes of death of the individuals  
“ whose histories I am analyzing, and for that reason I count  
“ on the reader’s approbation of my conclusions.

“ In eight of the twenty cases, where all of the organs  
“ were examined, the death of the patients remained unex-  
“ plained by the condition of the organs. It has seemed  
“ to me difficult, not to say impossible, considering the re-  
“ marks which I have just made to explain the death in five  
“ cases. In seven others, this mode of explanation was suf-  
“ ficiently satisfactory; and,” he concludes, “ observation  
“ shows that there is in this disease something beyond what  
“ we see—that its cause has sometimes a great deal to do  
“ with the death of those who are attacked by it—that the  
“ cause of the disease often kills by itself, or independently  
“ of appreciable alteration of the organs, and even up to a  
“ certain point of apparent derangement of function; we  
“ must remember that nearly the same thing happens in  
“ many cases of poisoning.”

Such is Louis’ account of the morbid appearances observed after death in the epidemic fever of Gibraltar. It is remarkable, however, that Dr. Gillkrest, whom Louis says assisted at the examinations and who sometimes acted as one of the interpreters to the Commission, states\* that “the  
“ colour of the liver was sometimes green, olive, or reddish  
“ brown, and that no traces of inflammation were disco-  
“ verable, and from the whole of what has appeared on this  
“ subject, the morbid change may be considered as being  
“ connected with derangement of function.”

\* Cyclopaedia of Medicine, art. Yellow Fever, p. 275.



The morbid phenomena of the West India fever have never been correctly described, the rapidity of decomposition often anticipating the examination of the surgeon. Dr. John Hunter, however, states that he found but trifling alterations of structure, either of the liver or spleen; the one being pale and something hard, while the other was pale but something soft. The latest authority on this subject, Dr. Arnold, states:—"Dissections have not afforded the satisfactory information expected from such examinations. Thus sometimes, especially if the patient has been cut off suddenly or early in the disease, little or no organic derangement can be observed; the blood appears to be completely decomposed, but at what period the decomposition commences in the ardent form of this fever, is not quite certain. In the vessels of the brain, some congestion is apparent, and often serous effusion, and some have found the brain and spinal marrow more soft than natural. The stomach is frequently found diseased in all those who die of the black vomit, the stomach and duodenum being sometimes found covered with spots resembling erysipelatous gangrene. The liver is sometimes inflamed, and the gall-bladder contains dark coloured bile, though sometimes it is nearly empty. The spleen is not much altered."\*

In the formidable African or Sierra Leone fever, Mr. Boyle states:†—"The stomach is generally the principal seat of diseased action in the endemic fever. A deposition of serum and considerable venous congestion of the membranes of the brain were almost always observable, but nothing further. While with respect to the stomach, on the contrary, some slight trace of inflammatory action, either in that organ or in a neighbouring intestine, seldom failed to present itself. It may also be worthy of remark that the inflammatory appearance alluded to was generally confined to the lower portion of the stomach, and in the generality of cases extending through the pyloric orifice, and rarely failing to occupy a small portion of the duodenum im-

\* On Bilious Remittent Fever, p. 23 to 25.

† P. 172.

“ mediate around the entrance of the *ductus communis chole-*  
 “ *dochus* into the intestine, that duct being ordinarily nearly  
 “ impervious, or choaked as it were by dark-looking, thick, vis-  
 “ cid bile. The following,” he adds, “ is a specimen of the  
 “ ordinary appearances met with on examination of the bodies  
 “ of persons who have died from the endemic fever without  
 “ any medicines having been given them till twelve or fourteen  
 “ hours before death. On laying open the stomach, traces  
 “ of active inflammation were seen all round the pyloric  
 “ orifice, and thence along the duodenum to the entrance of  
 “ the biliary duct, around which, to the extent of a Spanish  
 “ dollar, the inflammation seemed to have attained its great-  
 “ est height. There were slight diverging patches, ascending  
 “ from the pyloric orifice upwards towards the stomach, but  
 “ evidently not so distinctly marked as those previously de-  
 “ scribed. All the other abdominal viscera were healthy;  
 “ the only deviation from the natural state consisting of  
 “ venous distention; the mesenteric, splenic, and other  
 “ large trunks being gorged, whilst those ramifying on the  
 “ external coat of the intestines appeared, in many parts, as  
 “ if they had been injected.”\*

From all these data, it seems probable that the more specific action of the poison producing the severer forms of paludal fever, will prove to be on the mucous membrane of the stomach, while the liver and spleen will be found to be more rarely affected, and, perhaps, limited to particular countries. It seems also established that the substance of the brain is rarely diseased, and that even in cases where profound coma has taken place, that the morbid states by which this might be explained, have not been discovered. The membranes of the brain, though more commonly affected, present only appearances common to many other diseases, and by many supposed to be either fortuitous, or to arise from stasis, or the longer duration of the last agonies of life.

*Symptoms.*—The paludal poison, according to the dose or

\* P. 175.



susceptibility of the party, produces two distinct varieties of fever, or the intermittent and remittent fevers. The former has many varieties, denoted by the different periodic intervals which elapse between each paroxysm, while the varieties of the latter are denoted by the greater length of the febrile paroxysm, and by the greater gravity of the disease altogether. The varieties of intermittent fever are the—

*Febris intermittens quotidiana.*

*Febris intermittens tertiana.*

*Febris intermittens quartana.*

The varieties of remittent fever are the—

*Febris remittens mitior.*

*Febris remittens gravior.*

*Febris remittens gravior cum ictero.*

The symptoms of intermittent, remittent, and of yellow fever, differ in so many respects from each other, that it may be doubted whether these diseases arise from the same cause, however modified. The circumstance, however, of intermittents passing into remittents, and remittents into yellow fever, and conversely of remittent and yellow fever terminating in intermittent, is among the best established facts in medicine. Doctors Rush, Caldwell and eleven other physicians, in answer to the Governor of Pennsylvania, stated that “the common bilious and yellow fever often run into each other.”\* On another occasion, Dr. Rush adds: “never has the unity of our autumnal fever been more clearly demonstrated than in the present epidemic; its four grades, the intermittent, remittent, the inflammatory bilious fever, and the malignant yellow fever, have all run one into each other. In many instances, a tertian has ended in death, with the black vomit; and fever with face and eyes suffused with blood, has ended in a quotidian.” Dr. Pinckard, also, who witnessed paludal fever on a large scale in Guiana,

\* New York Medical Repository.

Martinique and St. Domingo, says: “whether it be denominated a seasoning or yellow fever, or marked by any other appellation, it is only the common bilious fever of hot climates, and appears under an intermittent, remittent or continued form, according to the soil and situation of the place, or habit of body, or other circumstance of the person attacked. It happened to myself to receive newly arrived soldiers at the same time with the seasoning malady, under all the vicissitudes of its intermittent, remittent and continued form, and notwithstanding each has been differently attacked, all of them have died in the course of a few days, with every symptom of the most malignant yellow fever.” And, again, “that these run indiscriminately into each other; a quotidian or remittent sometimes becoming a malignant yellow fever, and a yellow fever sometimes degenerating into a remittent or intermittent.”\* Dr. Bancroft,† also, states that during his services as physician to the army under Sir Ralph Abercrombie, and also during his residence in Jamaica, he has repeatedly seen, as well in his private practice as among the military, the same phenomena. In the East Indies,‡ Mr. Annesley states that the conversion or transition from one form of fever to another is familiar to every experienced observer of the disease within the tropics. As the testimony borne by every practitioner conversant with paludal fever is to the same effect, it follows that intermittent, remittent and yellow fever are mere varieties of one and the same disease, and originate probably in a minimum, medium and maximum dose of the paludal poison, when, at least, introduced in such quantity into the system as occasions fever.

The amount of paludal fevers varies greatly in different countries. In Great Britain it produces but a slight increase of the whole mortality, and in the north of Europe, generally, from the drainage and improved modes of cultiva-

\* Pinckard's Notes in the West Indies, vol. ii, p. 468-490.

† Sequel to the Yellow Fever, p. 13.

‡ Sketches of the Diseases of India.



tion, it is fast decreasing. In the West Indies, however, this class of disease is the principal source of sickness and mortality, and in the Windward and Leeward command comprises considerably more than one third of the whole admissions into hospital, and about half the deaths, and compared with the same diseases in this country among the troops, the admissions are ten times and the deaths twenty-five times as numerous. Among the whole force in the Windward and Leeward Island command, the admissions from fever in twenty years were 62,163, or 717 per 1000 of the annual mean strength, of which there died 3,195, or 36.9 per 1000 mean strength annually. In Jamaica, the proportion has been still greater, the admissions having been as high, as 910 per 1000 mean strength, and the deaths 101.9 per 1000 mean strength annually. In Demarara and Berbice, the numbers attacked by intermittent fever have been often equal to the whole force of the colony.

The relative frequency of the different types of paludal fever varies as greatly in different countries as their aggregate amount. In the Windward and Leeward Island command, the admissions from intermittent fever form about two fifths of the total number admitted into the hospital labouring under fever. But it does not prevail equally in all the settlements belonging to this command, but is principally confined to the low marshy settlements of Demarara and Berbice, where it has been a great source of inefficiency, particularly since 1830; the number attacked in the course of the year having been often equal to the whole force of the colony. Intermittents are also very common in Trinidad, owing to the vicinity of the barracks to the marshes, but in other islands they are comparatively rare, and in some almost unknown. In Jamaica, intermittents form about one seventh of the whole number. At Bona, in Africa, they are as three to two nearly; and in the Ionian Islands, about one in three and a half. The annexed tables, however, will show more distinctly the varying proportions, and are taken from Major Tulloch's statistical reports.

FEVERS OCCURRING IN THE WHOLE FORCE OF THE WINDWARD AND  
LEEWARD ISLAND COMMAND, IN TWENTY YEARS.\*

Fevers.	Admitted.	Died.	Proportion of deaths to admissions.
Quotidian Intermittent Fevers. . . . .	24,607	149	1 in 165
Tertian. . . . .	1,973	11	1 in 179
Quartan. . . . .	133	1	1 in 133
Remittent. . . . .	17,799	1,966	1 in 9
Common continued fever. . . . .	16,821	726	1 in 23
Yellow Fever (Icterodes). . . . .	774	331	1 in $2\frac{1}{8}$
Typhus . . . . .	48	11	1 in $4\frac{1}{3}$
Synochus . . . . .	8		0 in 8
Total	62,163	3,195	1 in 20
Annual ratio per 1,000 mean strength.	717	3.69	

FEVERS OCCURRING IN THE WHOLE FORCE IN THE JAMAICA COMMAND,  
IN TWENTY YEARS.†

Fevers.	Admitted.	Died.	Proportion of deaths to admissions.
Intermittent Fevers. . . . .	6,090	37	1 in 165
Remittent. . . . .	38,393	5,114	1 in 8
Common continued. . . . .	1,971	86	1 in 23
Yellow Fever (Icterodus). . . . .	20	15	1 in $1\frac{1}{3}$
Synochus . . . . .	448	1	1 in 448
Total	46,992	5,253	1 in 9
Annual ratio per 1,000 mean strength	910	101.9	

In the Ionian Islands there were admitted cases of fever  
in twenty years as follows :

Fevers.	Admitted.	Died, includ- ing invalids sent to Malta	Proportion of deaths to admissions.†
Quotidian Intermittent Fevers. . . . .	5,363	44	1 in 122
Tertian. . . . .	3,848	11	1 in 350
Quartan. . . . .	107		0 in 107
Common continued. . . . .	15,855	229	1 in 69
Remittent Fevers. . . . .	6,934	623	1 in 11
Synochus. . . . .	43	5	1 in 9
Typhus. . . . .	10	4	1 in $2\frac{1}{2}$
Total	32,160	916	1 in 35
Annual ratio per 1,000 of mean strength	457	13	

\* Tulloch's Statistical Reports, p. 26.

† P. 46.

‡ During the Peninsular war, 22,914 cases of intermittent fever were  
admitted into the regimental hospitals, and of these, 291 died or one in



Every form of fever is much more prevalent in these islands than at the other Mediterranean stations, as will be seen by the following comparison.

ADMISSIONS PER THOUSAND OF MEAN STRENGTH ANNUALLY.

Fevers.	Gibraltar.	Malta.	Ionian Islands.
Intermittent Fevers. . . .	5	8	132
Remittent Fevers. . . .	5	9	99
Common continued Fevers. . .	117	152	226

The prevalence of remittent fever in the Mediterranean, is in a great measure confined to the months of July, August, September and October. It sometimes commences in June and continues till November, but rarely occurs at any other period of the year. In this respect it differs materially from the remittent fever of the West Indies and of Western Africa, which rages with great severity at all seasons, though more commonly from July to October.

At Bona, on the northern coast of Africa, occupied by the French, in the space of fourteen months, there occurred:—

Fevers.	Admissions.	Died.	Proportion of deaths to admissions.
Quotidians . . . .	1,582	40	1 in 39½
Tertians . . . .	730	12	1 in 61
Remittents . . . .	79	2	1 in 39½
Continued Fevers . . . .	1,332	80	1 in 16½
Total	3723	134	1 in 28

The minimum dose of the paludal poison gives rise to the simplest and least dangerous form of the disease, or to intermittent fever. The varieties of intermittent fever are distinguished from each other by the interval of time which elapses between each paroxysm. For instance, when the paroxysm returns every twenty-four hours, it is termed a quotidian; when every forty-eight hours, a tertian; and seventy-nine, shewing that the mortality among troops on actual service in the Mediterranean, is increased 50 per cent.—Med. Chir. Trans., vol. vi, p. 415.

when every seventy-two hours, a quartan; and these primary types have been extended by early writers to every period comprised within a mensual or bimensual period.

Of these primary types it has been supposed that in this country the tertian is by much the most frequent, then the quartan, and lastly the quotidian. But this law is by no means general, for M. Maillot treated 2,354 cases of intermittent fever, occurring in the French army now in the occupation of a portion of the northern shores of Africa, and he found of that number, 1,582 were quotidian, 730 tertian, and 26 quartan. In the Peninsular war at Alta de Chaô, the quotidian was likewise the prevalent type, and in October, 1812, they were in the proportion of sixteen to one of any other type.\*

Most authors who have written on intermittent fever, have stated that the accession of the quotidian paroxysm occurs early in the morning, that of the tertian about noon, and that of the quartan in the afternoon, or between three and five o'clock. But to this law there are many exceptions, for, according to Maillot, out of 1,582 quotidians, 1,089, instead of early in the morning, occurred from midnight to mid-day, and 493 from mid-day to midnight. Out of 730 tertians, instead of about noon, 550 occurred from midnight to mid-day, and 180 from mid-day to midnight. Out of twenty-six quartans, instead of the afternoon, thirteen occurred from mid-day to midnight, and thirteen occurred from midnight to mid-day. The paroxysm returned, in the great majority of cases, from nine to twelve o'clock, or from ten to twelve o'clock for the quotidian, and from nine to ten o'clock for the tertian.

Besides the primary types that have been mentioned, early writers have noticed many compound forms of the disease, as a double tertian, in which the fit returns every day about noon, and is thus distinguished from the quotidian, which is supposed to make its attack some hours earlier. A triple tertian is the occurrence of two paroxysms every second day, and of one paroxysm on the intervening day.



The quadruple tertian is that in which two paroxysms return every day. They have also described double, triple and quadruple quartans, but these varieties are seldom seen in London in the present day, and as they are no longer considered as denoting a particular treatment, they have ceased to attract attention.

The febrile paroxysm or fit of intermittent fever, has three stages, a cold stage, a hot stage, and a sweating stage. These different stages are not necessarily of equal duration or intensity, but greatly vary in different cases. The duration of the cold stage is from a few minutes to five or six hours; and in general, if the disease be severe, the shorter the cold stage, the longer the hot stage. The hot stage may last from half an hour to any period less than twenty-four hours. The sweating stage is generally shorter than either of the former, and sometimes hardly exists at all. The rule, however, is that the quotidian has the shortest cold stage and the longest hot stage—the tertian, a longer cold stage and a shorter hot stage than the quotidian; while the quartan has the longest cold stage and the shortest hot stage of all the varieties.

The disease may be sudden in its attack, and without previous illness, but more commonly it is preceded by general indisposition, head-ache, weariness, pains in the limbs, thirst, inappetency, white tongue, frequent pulse, high coloured urine, and dark coloured discharges from the bowels. These prodromes are accompanied with well marked exacerbations and remissions of fever, displaying a periodical tendency. After this feverish state has lasted from four days to a fortnight, the patient is seized with a severe rigor, and the ague is manifested. The phenomena of a paroxysm are the following :—

The paroxysm may, like the disease, be of sudden invasion, and the patient in good health up to the moment of attack, or it may be preceded by langour, debility, unwillingness to exertion, and by frequent yawnings and stretchings. In which ever way the cold stage begins, the patient experiences, first a sensation of coldness of the extremities, then of the back, and lastly of the whole body; at the same time, the nails turn blue, the features shrink and become palid and

sharp, and if the case be severe, the whole body is shrivelled, turns purple, and is "goose-skinned." The coldness increasing, the motor nerves of the fifth pair are first affected, and the teeth begin to chatter, and this tremor extends to every muscle, till the whole body shakes with rigor. Cough, dyspnæa and oppression of the præcordia now occur, with a sense of painful constriction round the temples and down the back. The patient suffers from nausea and vomiting, and the latter symptom is speedily followed by the hot stage. When the cold stage has lasted a period varying generally from half an hour to two hours and a half, a re-action takes place, accompanied by partial warmth, flushings, and at length, the whole body acquires a heat greater than natural, or from  $105^{\circ}$  to  $107^{\circ}$ .\* As the heat returns to the surface, so also does the colour, and the body, especially the face, is preternaturally red and swollen. The hot stage being now formed, the heart and arteries beat with unusual violence, and headache, with frequent pulse, together with all the distressing symptoms of continued fever, are present. The mean duration of this stage is from three to eight hours. At its close, a gentle moisture breaks out, first on the forehead, and thence extends till the patient lies in a general sweat, sometimes so profuse as to soak the bed and linen as completely as if they had been dipped in water. After the sweat has continued to flow for some time, the fever gradually abates, a state of apyrexia ensues, and the paroxysm is terminated, and a sensation of exhaustion excepted, the patient is fully restored to health. Sometimes, however, he continues pale, weak, debilitated and incapable of all exertion, till on the recurrence of the paroxysm, the symptoms just described are repeated. In the course of the paroxysm many changes take place in the functions of many organs of the body.

Upon the approach of the attack, the pulse is slow and weak; but as the sense of coldness increases, it becomes small, rapid and irregular. When the hot stage forms, it becomes regular, full, strong and frequent, and on the sweat

\* In six cases in which the temperature was noted by Dr. Arnold in Jamiaca, the minimum was  $103^{\circ}$ , the maximum heat,  $105\frac{1}{4}$  —P. 134.



flowing, it again becomes soft, less rapid, and, at length, returns to its natural standard.

The respiration, also, suffers some changes ; for during the cold stages it is short, frequent and irregular ; as the hot stage forms, it becomes fuller and freer, but still frequent and anxious. The sweat relieves this anxiety, and on its ceasing, the breathing returns to its ordinary state.

The functions of the stomach are impaired, so that on the approach of the cold stage, the appetite is lost, and does not return till some time after the termination of the paroxysm. As the cold stage advances, nausea and sickness frequently take place, and the matters thrown up are bilious. The vomiting commonly puts an end to the cold stage and brings on the hot stage. As the hot stage forms, the nausea and vomiting abate, and when the sweat breaks out, they cease altogether. A considerable degree of thirst is felt during the whole paroxysm.

In the course of the paroxysm there is a considerable change in the state of the urine. During the cold stage, the urine is abundant, colourless and without sediment. In the hot stage, it is high-coloured but still void of sediment ; but as soon as the sweat flows freely, the urine begins to deposit a sediment, commonly lateritious, and this deposition continues for some time after the paroxysm has terminated.

The tongue, in mild forms of the disease, is clean in the cold stage, white in the hot stage, and again cleans after the sweat has flowed. If the disease be of some standing, the tongue is white, not only during the whole of the three stages, but also during the interval of apyrexia. In the most severe forms of the disease, the tongue at length becomes brown ; first in the hot stage, then during the cold stage, and lastly, not only during the whole paroxysm, but during the apyrexia.

With respect to the intellect, the mind is generally enfeebled, and the attention and recollection much impaired during the whole paroxysm. In severer cases, delirium comes on during the cold stage, though more usually not till the hot stage is formed, when it is not uncommon. The

senses, likewise, though much impaired in the cold stage, are acutely sensible in the hot stage. Head-ache and muscular pain of the back and limbs frequently last throughout the whole paroxysm.

Excepting some unusual cases, which are attended throughout with diarrhæa, the patient seldom passes a stool till towards the close of the paroxysm, when it is generally a loose one. It frequently, also, happens that during the cold stage, tumours subside and ulcers dry up, but the tumour generally reappears, and the ulcer again discharges as soon as the sweating stage is formed.

These are the leading symptoms of intermittent fever as it now appears in this country. Early writers are full of accounts of the much greater severity of this disease, and of its being ushered in with coma, delirium or frenzy, and accompanied with pleuritis, hepatitis, splenitis, etc. The modern mode of treatment, however, has so greatly diminished the severity of the paroxysm, that these symptoms are rarely observed. If, however, from any cause the fever be prolonged, so that the poison has time to set up its secondary actions, the symptoms of dropsy, of jaundice, of peritonitis, of hepatitis, of splenitis, or of inflammation, or derangement of any other organ or tissue that may be diseased, will of necessity be added to those of the fever. In these cases an additional calamity, not necessarily, but occasionally awaits the patient; for the type may now change to one of greater severity, and from intermittent become either remittent or continued.

The paroxysm of intermittent fever, of whatever description, is conventionally considered to terminate within twenty-four hours, for if prolonged, it is termed remittent fever. The duration, however, varies in different types. Dr. Brown conceives the mean length of a quotidian to be sixteen hours, that of a tertian, ten hours, and that of a quartan, six. In London, however, this calculation is in great excess, for in the majority of cases, the paroxysm does not exceed from two to six hours, and, consequently, the mean is hardly more than four hours.



It is very seldom that this fever consists of a single paroxysm, for usually the febrile phenomena occur many times, so that the whole duration of the disease, when left to nature or treated improperly, is frequently long and variable. Horace speaks of it as lasting five months in his day.

Jupiter, ingentes qui das adimisque dolores,  
Mater ait pueri menses jam quinque cubantis,  
Frigida si puerum quartana reliquerit, illo  
Mane die, quo tu indicis jejunia, nudus  
In Tiberi stabit : casus, medicusve levarit  
Ægrum ex precipiti, mater delira necabit  
In gelida fixum ripa, et febrim reducit.

HORATII SERMONUM, LIB. II, SAT. III, L. 289.

Sydenham speaks of a duration much more prolonged, for he says, “bleeding is so pernicious in quartans as to occasion  
“the disease to last a year in young persons, that otherwise  
“would have gone off in six months; and in the aged, who,  
“if bleeding had not been used, might have recovered in a  
“year, there is danger in its being prolonged beyond its  
“stated time and of its proving mortal in the end.” Under the improved treatment of modern times, however, all these calamities are now happily averted, and, generally speaking, intermittent fever in the London Hospitals, terminates after a very few, perhaps, three or four paroxysms.

*The Symptoms of the remittent and yellow fever.*—A higher degree of the paludal poison, or a medium and a maximum doses, produces remittent fever, and its more intense form yellow fever, for the latter disease differs in no respect from the former, except in the jaundice which accompanies it, and in the remissions being less complete. There are so many grades of intensity in remittent fever, varying as it does from a severe intermittent to yellow fever, and so many modifications impressed on it from the great variety of country over which the disease is spread, that it is extremely difficult to generalize the phenomena.

In the mildest form, the febrile excitement may not proceed beyond that of mild synochus\*; indeed, experience

\* Cyclopedia of Med. Art. Yellow Fever, by Dr. Gillkrest, p. 270.

warrants the conclusion that an individual, especially if a child, may pass through the disease with no more than a slight feeling of indisposition for a day or two, and in epidemics of ordinary severity, such mild attacks may occur in the proportion of ten or twelve to one of the severer grades, and their occurrence will usually be found more frequent as the end of the epidemic season approaches.

The severer forms of remittent fever may be preceded by languor, restlessness or chilliness, symptoms which usher in a short cold stage, but in other cases the attack is sudden, and the patient, for instance, immediately after a hearty meal, is seized most unexpectedly with faintness, vertigo, confusion of thought, and then almost without a rigor, although his skin is cold and the pulse small—a hot stage, usually of much greater intensity than that which accompanies the worst forms of intermittent fever, follows.

The hot stage is usually marked by much cerebral affection, as severe head-ache, a painfully acute state of every sense, an injected state of the conjunctiva, with great action of the carotid arteries. These symptoms are frequently accompanied by delirium, sometimes of a violent character, while at others, the patient is oppressed by great drowsiness, lethargy or coma. The stomach, also, in many cases, is the seat of great pain or uneasiness, and this is followed by constant vomiting, and the matters vomited are either colourless or bilious, or else blood. The duration of this paroxysm varies considerably. When the disease is mild, it may terminate in six or seven hours, but if severe, it may last fifteen, twenty-four, thirty-six, or even forty-eight hours, and Dr. John Hunter once saw a case in which there was no remission for seventy-two hours. The fever, however, at length remits, and the hot stage declines, sometimes with sweating, but at other times without any sensible increase of perspiration.

The duration of the remission which follows, varies as much as that of the hot stage. Sometimes it does not last longer than two or three hours, but more commonly it extends to ten, fifteen, thirty and even to thirty-six hours. The fever then returns, and, in some cases, assumes a quo-



tidian type, and has an exacerbation every day, and nearly at the same hour, yet more frequently, there is no regularity in the times, either of its accession or remission.

The second paroxysm is always more severe than the first, if the progress of the fever has not been checked during the remission, and usually neither any cold stage, rigor or even chilliness precedes it. On the other hand, all the febrile symptoms run much higher—the skin is hotter, the pulse quicker, the head-ache greater, the senses more confused, the delirium or coma more violent in degree, and more sudden in their accession—and these symptoms sometimes persevere either with or without the black vomit, and with dejections of a similar matter, till they terminate in convulsions, or else in the death of the patient. Delirium and coma, however, though frequent concomitants of the hot stage, are not essential conditions of it, for the fever often proves fatal without the intellect being in any degree affected.

This severe remittent fever is sometimes accompanied by a symptom, which has given a name to the disease as though it were a distinct species, or by a yellowness of the conjunctiva, and also of the skin, and hence the term yellow fever.

The yellow fever is, then, simply a remittent fever, with the addition of jaundice. This variety is remarkable for its greater severity, and for the sudden aggravation of all the symptoms. The jaundice may occur in the first paroxysm, accompanied by a sudden and almost total loss of strength, by stupor, subsultus tendinum, pain and irritability of the stomach, by incessant retching, and that retching accompanied by the black vomit, and this so violent that the patient will sometimes die in the space of twelve hours. More frequently, however, it does not appear till the second or third paroxysm, and the patient then sinks with all the bodily and mental affections incident to the last stage of typhus. Occasionally, however, the course is different.

Dr. Wilson has remarked that the term insidious has often been applied to the West Indian fever, and with great propriety, for he states that while the poison is frequently

sapping the powers of life, there is often little to inform us of the mischief that is going on within, so that the symptoms frequently do not prepare us for the fatal issue. "In the midst of our security," he adds, "and when we are imagining all is going on well, we are shocked by the sudden eruption of the black vomit or the accession of profound coma, rapidly producing death." The insidious nature of this severe disease is, also, a remarkable characteristic of the fearful epidemic that rages in Sierra Leone.

"There was no great degree of heat," says Sir William Barry, "or dryness of the surface of the body, but on grasping the limb or body firmly, a very peculiar stinging sensation of heat was communicated to the hand, which it retained for a considerable time. The pulse was hurried and sometimes full, but seldom indicated any degree of inflammatory action. The eyes were generally suffused, and in most cases, there was considerable anxiety during the first stages of the disease. This train of symptoms generally lasted the first thirty-six or forty-eight hours, when the danger became manifest in the dark fluid which was passed downwards in considerable quantity, containing innumerable small floating flocculi, which had very much the appearance of the morbid and broken down fibrine of the blood. The patient, about this time, felt much relieved and unconscious of his danger, and this delusive state gave hopes to the attendants. This calm was followed by a morbid torpidity or by a low delirium, which continued till the fourth day, when a fluid, the invariable forerunner of a fatal termination, made its appearance, at first, in small quantities and mixed with the ingesta, but afterwards ejected from the stomach in amazing quantities, and with a most extraordinary spasmodic force. This fluid had the appearance of a broken down and diluted coagulum of the blood, and frequently with portions of coagulable lymph, assuming the appearance of the inner membrane of the stomach. It gave a dark stain to linen not easily removed, and a raw unpleasant odour, so perfectly peculiar, that on entering the chamber, the state of affairs became immediately



“manifest. In some cases, a troublesome hiccough occurred, and the matter vomited was less abundant.

“The state of the patient’s mind was, also, most peculiar, for the poor sufferer appeared entirely unconscious of his hopeless state, and generally expressed himself as being much better, until the vital heat receding from the surface, dissolution took place, sometimes preceded by violent straining of the eye-balls and incoherent expressions, or else by some convulsive motions. Occasionally a dingy yellow appearance of the body, particularly of the neck and chest, took place prior to those symptoms.”

The *cerebral and spinal systems*.—Head-ache is one of the first and most constant symptoms of remittent fever. It most usually appears at the commencement, and is generally severe, being accompanied with throbbing of the temporal arteries, and in the Gibraltar fever, according to Louis, it subsided towards the close of the first half of the disease. Sleep seems to fly the pillow of the patient in this disease, and all the cases communicated to Louis had no sleep the first night, and only one half enjoyed a little rest on the two following nights; on the fourth or fifth day, the disease, when fatal, terminated. This absence of all drowsiness in almost all the persons attacked by the yellow fever of Gibraltar, in 1828, was remarkable, “and forms,” says Louis, “a distinctive difference between remittent and typhoid fevers.”

The intellectual faculties are generally unimpaired in the first paroxysm of remittent fever, and occasionally not only during the remissions, but throughout the whole disease. “Seven cases,” says Louis, “retained their intellectual faculties up to the moment of the fatal termination; while nine others were only slightly delirious during a little less than the last twenty-four hours;” and, consequently, Louis considers this symptom to belong rather to the last agony than to the disease. He is of opinion, likewise, that we cannot attribute the head-ache to any appreciable morbid condition of the brain, which was usually natural, nor to disease of the mucous membrane of the stomach; for, in almost all cases, this last affection did not come on until after the commence-

ment of the head-ache—was most considerable after the head-ache had abated, and occurred in cases where there was no headache.\* The absence of delirium has been occasionally observed in the West India fever by Dr. Arnold; but between the tropics, the cerebral affection usually occurs earlier† than appears to have been the case at Gibraltar, and is often followed by coma, which symptom, indeed, may exist from the first attack of the disease. The following case of Dr. Matthias is a remarkable instance of the occasional unembarrassed state of the mind up to the very last moment. “It is under this form of the disease that patients died,” says Louis, “without taking to their beds—‘on foot’—as ‘it was termed by their friends.’”

“Dr. Matthias, who died at Gibraltar, after an illness of four or five days, experienced no other symptoms but severe pains in the calves of his legs, and a suppression of urine. He had no nausea and did not vomit; his mind was perfectly clear during the whole course of the disease; he noticed the suppression of urine, dictated three or four letters to a friend, begged him to write rapidly the last that he might sign it, then devoted a little time to an affectionate intercourse with this friend, and soon after, unable to speak, he thanked the friend by a sign, and in a quarter of an hour was dead.”

A similar case is given by Dr. Arnold, as occurring in Jamaica‡ in the person of a gentleman managing a large plantation in one of the vales on the banks of the Rio Grande, a beautiful spot, “bewildering the senses of adventurous man.” “Fortune,” he says, “was favouring this worthy and excellent man in all and every way, when he was seized with malignant bilious fever, and died on the fifth

\* P. 178.

† That the brain is early affected in most instances, is evident from symptoms that the veriest tyro may discover at the bed-side, (p. 22). The poor deluded creatures became delirious generally about the termination of the first stage of fever, (p. 236). Again, (p. 235,) the characteristic features of the severer cases were early delirium, great vascular action, black vomit and death in the space of forty-eight hours after the invasion.

‡ P. 180.



“ day of the attack. I was not present during the sickness  
“ of this gentleman, but I was informed by the medical at-  
“ tendant that the brain was never affected, and that such  
“ was the insidious nature of the disease, that the patient  
“ was the first who became sensible of the danger, and when  
“ all hope had fled, his dying moments, calm and resigned  
“ in the extreme, were truly enviable.”\* When delirium  
has existed, this author likewise states it is not at all uncom-  
mon to see a patient sit up, ask for food, attempt to shave  
himself, dress and wish to quit the room, showing, as it  
were, a return of the mental faculties previous to death.

“ As to the *senses*,” says Louis, “ the hearing preserved its  
“ acuteness in all the cases in which we were able to ascer-  
“ tain exactly its condition. The sight, properly speaking, was  
“ was not affected,† although the suffusion of the eyes and  
“ sensibility to light were rather frequent. We found the  
“ conjunctiva more or less affected in all the cases, when it  
“ was examined at a period near the commencement of the  
“ disease. Its duration was not always the same, generally  
“ less than that of the disease; it was of one or two days  
“ only in two cases. In most instances, the redness had a  
“ double character, sometimes being of a uniform delicate  
“ rose tint, as if put on with a brush, and sometimes there  
“ was a more or less marked injection of the vessels of the  
“ conjunctiva. In cases in which the redness had not dis-  
“ appeared at the time the yellowness came on, the mixture  
“ of yellow and red in the sclerotic was very remarkable.”

In the West India fever, the eye, according to Dr. Arnold,  
was most expressive. “ The first glance we give a patient,  
“ we are astonished to see the general aspect of his counte-  
“ nance; his face unusually flushed, his eyes brilliant, ex-  
“ pressive of much animation, he answers with vivacity, and  
“ although he will complain of thirst, head-ache, pains in  
“ the back, loins and extremities, he fancies very little the  
“ matter with himself at this period. We find, however, as  
“ the disease advances to the second and third stage, the

\* P. 180

† P. 200.

“ eyes have lost their lustre, and are marked by an evident  
 “ expression of sadness, the countenance no longer evincing  
 “ the animated look before observed, but is succeeded by as  
 “ visible a contrast as it is possible to behold in the short  
 “ time already elapsed. The muscles of the face become  
 “ peculiarly marked, the nostrils drawn in, exhibiting a total  
 “ metamorphose, despair and anxiety appear predominating,  
 “ sigh follows sigh, a difficult respiration is evident, accom-  
 “ panied with pressure above the præcordia. If he is sen-  
 “ sible, he is indifferent, if otherwise, the delirium may be  
 “ constant or partial, and if the latter, patients will often  
 “ attempt to leave their beds, nay, the room. With these  
 “ prognostic signs, we may almost consider the patient irre-  
 “ vocably gone.”

“ If the delirium must be considered accidental, if it is to  
 “ be regarded as independent of the disease, if it is in no  
 “ way characteristic of the disease,” says Louis, “ the same is  
 “ not true of another symptom, the different degrees of which  
 “ form what has been called *malaise*, anxiety, restlessness,  
 “ jactation. In the acute diseases of Paris, we do not  
 “ nearly as often find that state of anxiety, and this makes me  
 “ regard it as characteristic of the disease we are studying.”

In the interval between the paroxysms of intermittent fever, the patient, though usually debilitated, retains a considerable portion of strength, and is able to keep, in some degree, about. But this is only occasionally the case in the severer forms of the disease. In the remittent fever of Gibraltar, Louis states that twelve patients who died on the fifth or sixth day, became quite weak, while two others, who died about the same period of the disease, experienced scarcely any prostration. “ These really insidious cases,” says Louis, “ were not un-  
 “ frequent, and certainly do not resemble the typhoid fever—  
 “ one of the principle symptoms of which is prostration.” Dr. Arnold, however, says of the Jamaica fever:—“ There  
 “ is no disease in which the muscular power is so much im-  
 “ paired, from the commencement to the termination, par-  
 “ ticularly if the invasion is brought on by syncope.”

“ All patients whose histories we have taken,” says Louis,



“ with but one exception, experienced, more or less, acute  
 “ pains in the back, limbs or loins. These pains came on  
 “ the first day of the disease, either before or after the chill,  
 “ in all except three. They continued, in various degrees,  
 “ through the whole course of the disease in two cases ; two  
 “ or three days only in three others, and in the other patients  
 “ they existed twenty-four hours only.”

The *Tongue*.—“ The teeth and fauces,” says Dr. Wilson,  
 “ are rarely encrusted, and the tongue is seldom foul or loaded ;  
 “ indeed, it is often clean in an extraordinary degree.” Dr.  
 Barry describes the tongue, in the African fever, to be in  
 general white and tremulous—in some cases, red and clean,  
 and in a few, presenting an appearance of ingrained black-  
 ness, but perfectly distinct from that collection of sordes,  
 which is a characteristic of typhus gravior. In the Gibraltar  
 fever, Dr. Gillkrest says, the loaded tongue, as if covered  
 with paste, has been mentioned by authors, but in our ex-  
 perience, a perfectly clean tongue has not unfrequently been  
 observed in a most dangerous attack, and he adds, that as  
 the stage of excitement proceeds,\* the tongue becomes so  
 black, shrunk and incrusted, that it has the appearance of  
 having been seared by a hot iron.

The *Heat*.—The temperature of the surface frequently does  
 not exceed, sometimes falls below, the natural standard.  
 Dr. Gillkrest says,† in a young and vigorous subject, the  
 heat of the skin may be of the pungent nature described by  
 some writers on fever, but in yellow fever, a temperate skin  
 is far from being always an indication of a mild attack. In  
 Jamaica, Dr. Arnold‡ considers that disease mild in which  
 the heat does not exceed 105° or 106° ; and he states that  
 the maximum of heat was always observed in the second pa-  
 roxysm. In malignant cases, he found the thermometer rose  
 to 107°, 108°, 109°, and even as high as 110°. In the last  
 stages of the disease, the temperature appears to fall con-  
 siderably.

\* P. 271.

† P. 270.

‡ This gentleman deduces from experiments on one hundred and seven  
 subjects, that the mean temperature of the system in health, in Jamaica, is  
 98°.19<sub>1</sub><sup>3</sup>/<sub>2</sub>.

The *Pulse*.—"The pulse," says Dr. Wilson, "is often not rapid as a febrile pulse, for it seldom rises to 120—generally does not reach 110—often is under 100, and is sometimes not more than sixty in a minute." In the West Indies, Dr. Arnold describes it as varying from 80 to 120, in the same fatal case. "In the cases we have taken," says Louis, "in no case did the pulse beat oftener than 100 in a minute. To mention two cases only—it was at 88, 100, 88, 70, the second, third, fifth and sixth days of the disease, in a patient who died at this last period. It was at 80 and 70 on the third day, and on the last day of the disease, in a patient who died at the same period as the other, or only a few hours earlier. So that the further we advance in the symptoms, the more confirmation we find of the action of the cause of yellow fever on the economy, being independently of apparent lesion of organs."\*

The *matters vomited*.—"In the West Indian fever," says Dr. Wilson, "there is sometimes, but not constantly, a quantity of bile vomited during the period of invasion. But after the fever is formed, the ejection of bile ceases, while the vomiting continues, and cannot, in the great majority of instances, be tranquillized till the disease be subdued. The fluid ejected is clean and colourless, sometimes sour and sometimes insipid. After the vomiting has continued two or three days, the fluid loses its transparency, and becomes turbid, black or brown. Such is the usual manner in which the black vomit comes on, yet it sometimes, though rarely, breaks forth suddenly; the thirst is not urgent, and the patient often passes through the disease without drinking." Dr. Gillkrest, also, describes a similar state of things, for he says,† "our experience during two epidemics, one in the West Indies, and that of 1828 at Gibraltar, by no means bears out the statement of others as to the bilious appearance of what is vomited in the progress of this fever. After having paid the closest attention possible to this point, we must, on the contrary,

\* P. 210.

† Cyclopædia of Medicine, p. 271.



“ state, that with the exception of the black vomit stage, and  
“ at the very commencement of the attack, what is thrown up,  
“ consists of the ingesta and a glairy fluid. Bile, also, is  
“ usually absent on an inspection of the stools and urine.” Dr.  
Henry Warren says,\* “ I ought here to observe that the  
“ black stools and vomitings, are vulgarly supposed to be  
“ only large quantities of black bile or choler, which false no-  
“ tion seems to be owing to that fixed unhappy prejudice  
“ that the fever is purely bilious. But let any one only dip  
“ a bit of white linen cloth, he will be soon undeceived and  
“ convinced that scarce any thing but mortified blood is then  
“ voided, for the cloth will appear tinged of a deep bloody  
“ red or purple, of which I have made many experiments.”  
Dr. Bancroft says,† “ the matters which constitute what is  
“ termed the black vomit have accordingly been deemed by  
“ many persons to be the product of a morbid secretion of  
“ the liver, or else of a morbid change in the bile. That  
“ neither of these, however, is the case, has been clearly as-  
“ certained by late examinations made upon the bodies of  
“ great numbers of persons who have died of the yellow fe-  
“ ver, for the stomach has sometimes been found loaded  
“ with this black matter, while in the same subject, not only  
“ the liver has been free from disease, but the bile in the gall  
“ bladder has been in its natural and healthy state. The  
“ matter of the black vomit is, also, essentially different  
“ from bile, first as it differs in colour, for bile, however  
“ concentrated or dark, always displays a yellowish greenish  
“ or yellow tinge, when spread on a white surface diluted with  
“ water, but this is never observed with the matter of the  
“ black vomit. Again, an addition of bile has so altered its  
“ nature, as to give it an appearance different from that it  
“ had before, nor could the black vomit be imitated by any  
“ mixture of various proportions of dark coloured bile with  
“ the fluids found in the stomach. There is a difference,  
“ likewise, most decidedly in taste, the black vomit being

\* Treatise on malignant fever in Barbadoes, p. 39.

† Essay on Yellow Fever, p. 23.

“always insipid when freed from other foreign matters,  
 “whereas, the bile preserves its intense bitterness. In many  
 “cases, portions of the inner surface of the stomach have  
 “been covered with a coat of thick blackish matter, and upon  
 “removing this coat, the parts beneath it, and no other were  
 “found inflamed. The substance thus obtained, was exactly  
 “similar to that of the black vomit and like it, incapable of  
 “being made to adhere again, when applied to the same or to  
 “any other parts. Hence, there is reason to believe that the  
 “matter forming this black covering must have been de-  
 “rived from the vessels of the inflamed part, especially as it  
 “could not have produced, the inflammation being so per-  
 “fectly bland, as to have been frequently dropped into the  
 “eye, without exciting any greater effect or sensation than  
 “water.”

The *Yellowness of the skin*.—“Yellowness of the skin,” says Dr. Gillkrest, “varying from the lightest to the deepest tinge,  
 “may occur as early as the third or fourth day, but it is  
 “often delayed till a more advanced period. This yellow-  
 “ness is usually first perceptible in the line of the larger  
 “vessels of the neck, next over the chest, and then over the  
 “whole body, the adnatæ becoming, at the same time, more  
 “or less yellow.” Dr. Bancroft says,\* “The yellowness begins  
 “in a few cases within the first forty-eight hours, sometimes  
 “on the third day, frequently not until the fourth or fifth. It  
 “is, indeed, sometimes observed a few minutes before or a  
 “little after death.† I believe that it might, in many instances,  
 “be first discovered on the eyes, but it is commonly first ob-  
 “served on the cheeks, extending towards the temples, and

\* P. 34.

† “The yellowness of the skin,” says Dr. Arnold, (p. 37), “is seen to  
 “come on in the first, second and third stages of the disease, sometimes  
 “before the lapse of twenty-four hours, sometimes not till the disease has  
 “continued some days, and sometimes not until after death. This extra-  
 “ordinary circumstance struck me as remarkable, not having seen it re-  
 “marked by any writer. Evidently the absorbents are at work after  
 “death.”



“ about the angles of the nose and mouth, about the lower  
“ jaw and on the neck, and on the course of the jugu-  
“ lar vein, whence it spreads in stripes and patches, along  
“ the breast and back downwards, so as at last to be-  
“ come universal in some patients, though in others it re-  
“ mains partial. The yellowness is sometimes of a dingy or  
“ brownish hue, sometimes of a pale lemon, and at others, of  
“ a full orange colour. When the yellowness appears only  
“ in patches or spots of a dingy or brownish hue, it is fre-  
“ quently intermixed with other spots of a florid red, purple,  
“ or livid colour.” Dr. Gillkrest affirms that the perspira-  
tion of these patients, is found sometimes to stain the  
sheets.\*

*Diagnosis.*—If one paroxysm constituted an ague, there are many diseases which might be said to simulate intermittent fever, as erysipelas, pneumonia and almost every acute affection. But the absence of a second paroxysm or the formation of an entirely different disease, readily distinguish them. A considerable irritation of the urethra or bladder, as in the operation for lithotrity, is often followed by a severe rigor and fever, but this rapidly subsides, unless the cause be renewed. Stricture has, also, in a few instances been found to cause a recurring paroxysm similar to intermittent fever and which has only subsided by the stricture being removed. There may exist some difficulty in distinguishing between the mild forms of remittent fever and typhus, but the nature of the country in which it occurs, or the circumstance of previous exposure to the action of the paludal poison, together with the fact of a more or less complete remission are usually sufficient to determine the diagnosis.

*Prognosis.*—We find in the bills of mortality for 1696, the number of deaths under the head of ague and fever, to have been 2775, and in the year 1700, 3676. In 1751, and the three following years, Dr. Fothergill remarked the regular

\* P. 273.

occurrence of intermittents every spring and autumn, but probably owing to the practice of draining, and to improved modes of treatment, the number of deaths from this cause, has been progressively diminishing, so that in 1800, there were only two from “ague.” The prognosis of every ague treated in London, and before any extensive disorganization of the viscera has taken place, is highly favourable.

The mortality from the different classes of paludal fever among the military may be best estimated from the following table.

Mortality from intermittent, remittent, and yellow fevers, according to the reports of the sickness and mortality occurring among the troops in the West Indies, the Mediterranean, and in North America, and presented by command of His Majesty to both Houses of Parliament.

Fevers	Windward and lee- ward com- mand.	Jamaica command	Gibraltar	Malta	Ionian Islands	Upper Canada	Lower Canada
Intermittent fever	1 in 169	1 in 165	1 in 60	1 in 311	1 in 236	1 in 1143	1 in 535
Remittent fever	1 in 9	1 in 8	1 in 11	1 in 24	1 in 22	1 in 11	1 in 5
Yellow fever	1 in $2\frac{1}{3}$	1 in $1\frac{1}{3}$	1 in $3\frac{2}{3}$				

When troops, however, are on actual service and exposed to all the hardships incident to that position, the mortality is still frightful among them. In the Walcheren expedition, the numerical force of our army amounted to 43,521 officers and men. Few accidents happened in the field, nevertheless 26,846 men were received into the hospitals in the course of “three months,” and the vast majority ill of intermittent fever. Two thousand of these are reported to have died abroad, and many also died after their return to this country.

The mortality from severe remittent and yellow fever is still more immense, and it may be laid down as an axiom that no troops can venture to encamp, or to do field duty even for a few days in low flat districts in tropical countries without sustaining enormous loss. It was this disease which committed such frightful ravages in the squadron of Admiral Hosier off Porto Bello in 1726. In the unsuccessful at-



tack on Carthage, the troops remained on shore but ten days, yet on their re-embarking, the sick were to the healthy as two to five, and ultimately one-fourth of the whole number was lost. In the late expedition to the Birman empire, within three months of the taking possession of Rangoon, more than 3000 men had died, or more than one-half the force employed on the service.

In civil life these fevers are also still immensely fatal. At Cadiz, containing about 140,000 inhabitants, one-sixth part died in 1800 in six months. At Xeres de la Frontera containing about 40,000 souls, 10,000 died in that same year. In Seville also out of 80,000 inhabitants, 76,000 inhabitants, are supposed to have been attacked, of whom it is estimated that from one-third to a half died. At Gibraltar in 1803, the mortality was one in three and only twenty-eight, persons are said to have escaped an attack out of 9000 inhabitants. The deaths among our troops in the West India islands in 1796, amounted to one half of the whole number. At present the number of deaths in the army from paludal disease is greatly reduced, partly from the easier duty of the troops, the better drainage of the country, and the construction of barracks and hospitals in more healthy situations, and the mortality now averages only one in eight of those attacked.

As has been frequently observed regarding other diseases, the malignity of the cases, and, consequently, the mortality is usually much greater in the first than in subsequent periods of yellow-fever epidemics. In Hurtados Decadas, it is stated that of the first 133 cases treated at Murcia in 1804, not more than three or four recovered. Dr. Rocheaux, one of the French physicians at Barcelona during the epidemic in 1821, states that in the early part of the epidemic, the mortality was in the proportion of nineteen out of twenty, that towards the middle it became much less, and at the close only two-thirds. In the early part of the Gibraltar epidemic of 1828, very few recoveries took place in the Civil Hospital, so that of the first thirty-five Jews received into the establishment, it is stated all but one were swept away. On the same occasion, two corps in particular, as officially stated to the authorities, by the late

Dr. Hennen, then medical chief, were early attacked by the disease in a peculiarly malignant form, and suffered a loss of about one-half of the cases.\* It follows, therefore, that the prognosis is favourable in every case of intermittent fever, when the patient can be removed at once out of the impure atmosphere. While on the contrary, the prognosis is greatly unfavourable, in almost every case of severe remittent or yellow fever especially at the first onset of an epidemic attack.

The following are among the most unfavourable symptoms, the early appearance of yellowness, intense rachialgia, incessant vomiting and jactation, deep sighing, depression of the pulse, singultus, and, according to some observers, the appearance of a few drops of blood from the nose, at a very early period of the disease. When these symptoms are present, a feigned gaiety or an assurance on the part of the patient that he suffers little should enhance our apprehensions.

A speedy dissolution may be looked for when the patient, in possession of his faculties, lies for the most part on his back, cold to the touch, and in a state of collapse, while probably he complains of agonizing internal heat and casts off the bed-clothes incessantly. "In the early part of the last epidemic at Gibraltar," says Dr. Gillkrest, "besides singultus, suppression of urine and black vomit, a very remarkable symptom sometimes took place a few hours before death, or a loud, incessant, monotonous wailing extremely distressing to all within hearing, although the patient lay apparently insensible to everything. In other cases, the shrunk ash-coloured countenance and injected eye, at the commencement of the disease, marked the deadly nature of the attack."

"Recovery may be hoped for when the pulse continues firm at the end of the third day, when the remissions are distinct, and the skin is of an equable temperature for the first two days. Some hour's sleep, also, not broken by vomiting, together with dejections of a proper colour, and

\* Gillkrest, p. 277.



“ the tongue becoming natural, and the secretion of urine in  
 “ proper quantity, are symptoms in a high degree favourable.  
 “ Still the prognosis should in all cases be guarded, for per-  
 “ sons sitting up in bed amusing themselves, and apparently  
 “ in a favourable state have been suddenly seized with black  
 “ vomit, and death has often frequently followed to the  
 “ utter astonishment of all the medical attendants.

*Treatment of intermittent fever.*—The ancients unacquainted with cinchona treated intermittent fever as the moderns do the simple phlegmasiæ. They bled, purged, bled again, and enjoined a complete and severe abstinence. They also used long continued friction, the hot bath, and as a last resource gave wine in increasing doses. This practice was so unsuccessful, that we know the hopes of the patient rested in most cases on the moral effect of the votive tablet, the magic charm or the amulet. Pliny tells us, that a sovereign remedy for the cure of a quartan was to cut your toe-nails, and throw the parings into an ant's nest, then to catch that individual ant, which had first touched them, and afterwards, so to incarcerate him, that he might be worn as a charm round the neck. The methods pursued by the ancients, were adopted, or nearly so, on the revival of medicine. Morton who practised before the introduction of bark, thus describes the treatment of Andrew Merville whose death he laments as a loss to the republic of letters. “ After the third  
 “ paroxysm of a tertian, an enema was thrown up but not  
 “ retained. He was now copiously bled, and his bowels  
 “ opened by a bitter decoction, and before the next  
 “ paroxysm, the magnum febrifugum or aqua theriacalis was  
 “ given. This paroxysm being formed, the patient was now  
 “ covered up, or rather buried under a heap of bed clothes,  
 “ when he fell into a colliquative sweat and died comatose.” So deplorable were the results of a simple antiphlogistic treatment, and indeed of any other treatment known at this period, that Sydenham calls upon every person possessed of a remedy to make it known, adding, “ if he does not, he is neither a good nor a wise man.”

There would have been no end to the miseries inflicted on

mankind by this disease had not the only antidote nature seems to have provided against this poison, been at length discovered. The plant cinchona, as well as its sanatory effects are said to have been known to the natives of Peru, long before the discovery of America, but to have been kept secret by them out of hatred to the Spaniards. The Jesuits, however, accidentally became acquainted with its specific properties, and employed it in 1638 in the cure of the lady of Count El Cinchon, a Spanish peer and viceroy of Lima. The remedy being successful, it became celebrated in Europe, and Linnæus has perpetuated the name of the family by applying the appellation cinchona to the eight genera and forty-six species of this plant now recognised by De Candolle. In 1661, it had obtained such reputation, that Innocent X. commanded his physician to draw up a *schedula romana*, recommending it as a salutary innocuous remedy in intermittent fevers, and directing it to be taken, *frigore febrile incipiente*, 3jj bis die. It was administered in this manner to the Arch-duke Leopold of Austria, but unsuccessfully, and as he died, it immediately fell into disrepute.

It was introduced into this country in 1658, but Mr. Underwood, an Alderman of the City of London, died likewise while using it, and this threw so much discredit on the remedy, that Cromwell died of intermittent without his physicians daring to prescribe it. A longer experience, however, gradually established it in public favour, so that at the conclusion of the lives of Morton and of Sydenham, its specific properties were generally admitted, and it has ultimately superseded in the cure of this class of disease, all other medicines.\* From this period until the introduction of quina, little

\* Cinchona appears to have been introduced into France about the year 1680, and principally by an Englishman, named Talbot, whence it was termed "*le remède de l'Anglais*." He usually exhibited it in wine, and in 1687-8, Louis XIV took it, and, consequently, all the French court. The Dauphin and his courtiers appear to have drank it as a liqueur, and Racine writes to Boileau, 17th of August, 1687 :—" *Qu'on ne voyait à la cour que des gens qui ont le ventre plein de quinquina*." As the court of



more was done than to determine the dose, the times of its exhibition, and the pathological condition, favourable or unfavourable to its action.

The most efficient preparation of crude cinchona was determined to be the powder rather than the decoction of bark, and the dose of the pulvis cinchonæ has been fixed by general usage at a drachm for an adult, and this dose given every four or six hours has been found, when persevered in for three or four weeks or longer to cure the great majority of intermittents in and about London. Occasionally this was found inefficient, and it became necessary either to increase the quantity or to augment the efficiency of the dose by additional stimulus. Fordyce and Dr. Huck have given it to as large an amount as  $\bar{z}$ ss and even  $\bar{z}$ j for a dose, and a few patients were cured, but the stomach often rejected this crude mass, and incessant vomiting retarded the convalescence of the great majority thus treated.\* It was now found that an additional stimulus was greatly to be preferred to an increased quantity of cinchona and that a scruple of cayenne pepper, (*piper indicum*,) added to each dose, frequently succeeded in curing an ague when bark alone has failed. Sometimes, however, cin-

Louis XIV then gave "le ton" to all Europe, the use of this remedy quickly spread. Talbot kept his secret so well, that he required from each patient four hundred pistoles, or about two hundred pounds. Louis XIV, at length, bought the secret, which proved to be cinchona infused in port wine.

\* Sir James Macgrigor, speaking of the cure of intermittent in the Peninsula, says:—"When bark is exhibited, an ounce or an ounce and a half should be given in the six hours before the expected paroxysm, smaller quantities being given during the interval. I have reason to think that in many cases where bark has failed, it had not been given in sufficient quantity; aromatics or opiates will be required to make it sit on the stomach. Again, I may mention that in the Peninsula as well as in other quarters, I have frequently known an empirical prescription with bark succeed in cases where, when given in the usual manner, this medicine had failed. It is, as far as I can recollect, an ounce of bark, a table spoonful of Jamaica or half a tea spoonful of Cayenne pepper, and a whole nutmeg mixed and given in one dose, a short time after the action of a gentle emetic, and between the paroxysms of recent cases. In two cases out of three, this will prevent the return of the paroxysm." (P. 418-419).

chona combined with cayenne pepper was inefficient, and in these obstinate cases, opium was found to be an admirable adjuvant, and the triple compound of pulveris cinchonæ, 3j, piperis indici 3j, c. opii grj. 4tis horis, has in general been an adequate remedy for the most intractable intermittents met with in London.

The occasional failure of crude bark, however prepared, has caused many other vegetable and mineral remedies to be tried in the cure of ague, and Fordyce has given camomile, wormwood, and gentian to the quantity of ʒjj during the intervals but failed in forty-nine cases out of fifty. In the Peninsular war, also, calumba, cascarilla, and quassia were tried and abandoned. In the Peninsular war, also copper and zinc, iron and antimony were often used, but without much success, while mercury egregiously failed. Of all the mineral remedies, however employed, in the cure of ague, arsenic has been, perhaps, the one most used and with most success, both in regular and in popular practice. Preparations of this mineral in the form of secret remedies were first vended and prescribed on the continent, and especially in Germany about the close of the seventeenth century. In this country they were first introduced, and known by the name of tasteless ague drops, and were long in use in the fenny districts. The efficacy of this nostrum, which on analysis, was found to contain arsenic, induced Dr. Withering and Dr. Fowler, about the same time, 1783, to employ a solution of white arsenic in the proportion of one 13th of a grain for a dose for the cure of ague, and in many instances, with remarkable success. The use of arsenic is, however, now generally abandoned in London, for in severe agues it often failed to effect a cure, while in mild intermittents, it was neither so efficient or so innocuous as bark, often producing nausea, vomiting, griping, painful diarrhæa, nettle-rash, or erysipelatous affections of the face and eye-lids. Among animal substances, strange to say, the spider, and its cobweb have been often prescribed, the former being bruised and wrapped in a raisin, and taken either in the cold fit or for three successive mornings, the latter in a five-grain pill thrice daily. The occa-



sional disappearance of the disease under the use of these latter means, must, from the general abandonment of the remedy, have been attributed to the influence of a powerful imagination.

The beneficial effect of giving opium in combination with bark, has been already mentioned, and it further resulted from another series of experiments that the practice of giving thirty to sixty drops of the *Træ opii*, “*per se*,” on the approach of and during the cold fit, was advantageous, and rendered this stage shorter and milder. This circumstance caused Dr. Lind to make the experiment of giving opium in the hot fit, and he states that in eleven cases out of twelve, the head-ache and fever abated, and profuse sweating with a perfect intermission followed. Dr. Lind, also, prescribed opium immediately after the hot fit, if any uneasiness, head-ache or any similar symptom, consequent on the fever, remained, and in nineteen out of twenty-two, he affirms, the relief was immediate. From many trials made with opiates, it results that they shorten and mitigate the violence of the paroxysm, but will not cure the intermittent.

Among other remedies proposed for assisting the use of crude bark or other less efficient remedy, is bleeding at the commencement of the paroxysm, or in the cold stage. This practice seems to have been followed by the earlier modern physicians, and La Rivière mentions an empiric who cured many tertians by the exhibition of a single purge, and afterwards by opening a vein at the very commencement of the fit. This practice has been revived by Dr. Mackintosh. “It is difficult,” says this physician, “to determine the quantity of blood it may be necessary to draw in any given case ; sometimes it requires twenty-four ounces. I have known three ounces suffice, and in one case, an ounce and a half produced the full effect. The better the vein is opened, the greater is the chance of destroying the disease at a small expense of blood, but in many cases, the operation is attended with considerable difficulty, from the convulsive tremors which affect the whole body. The blood sometimes only trickles down the arm, and as the system is

“relieved, the blood flows.” This treatment, though proposed on the hypothesis of venous congestion, has been repeated in India and in this country. Of the results of this practice in India, Mr. Twining speaks favourably,\* and terms it a great improvement in the treatment of intermittent. “In this country,” Dr. Stokes states from his experience, “there is very little danger of the patient dying “of debility, but in most cases, the fever took the character “of remittent fever, a form of fever more unmanageable and “less under the influence of bark.” He also adds, he has seen cases of intense pneumonia, of inflammation of the brain and of gastritis, occur immediately after the fever, has been cut short by bleeding. “Moreover, in almost “every instance,” he adds, “we were obliged to have “recourse to bark after the use of the lancet, and we could “not say the patient required less quinine than those “who had not been blooded.” Mr. Gill, also tried the same practice in the fevers of Lincolnshire, and states, that he feels quite certain that he had it in his power to convert many cases of intermittent fever into continued fever by bleeding in the cold stage. These facts are important, as they shew that bleeding tends to aggravate the primary and to predispose to the secondary actions of the poison.

The results of bleeding, without reference to the particular stage, is seldom witnessed in the present day, and the following case given by Majendie,† cannot be read without interest:—“I was called,” he says, “in consultation on a “young man in the vigour of his age, of a robust constitution, and who had enjoyed, until now, a plenitude of “health. Having gone, however, into the country a few “days ago, he was seized with a tertian fever, and the “physician who first saw him, bled him. As the severity of “the paroxysm was not diminished, he was bled a second “time, and delirium coming on after this, he was bled a “third time. At this period,” says Majendie, “I saw the

\* Med. and Phys. Trans. Calcutta, vol. v, p. 66.

† Leçons sur les Phénomènes Physiques de la vie, p. 145.



“patient—quinine was prescribed, and I recommended the  
“attending physician not again to open a vein. The latter,  
“however, finding the pulse full towards evening, again bled,  
“and the symptoms being aggravated during the night, he  
“bled the next morning for the fifth time. The patient was  
“reduced to a most deplorable state—the paleness of death  
“was on his face, his respiration loud and laborious, and he  
“shortly sunk after a most painful agony.”

Occasionally it has happened that notwithstanding the use of opium and of soda-water, the patient was sometimes reduced to extremity, from the stomach being unable to retain bark, when that remedy was often exhibited as an enema night and morning, in the dose of half an ounce to an ounce, in a pint of barley-water, and many agues were cured in this manner. In other still more delicate cases and where enemata were not retained, mattresses are said to have been filled with powdered bark, and patients are reported to have recovered by lying on them, and even bosom friends and jackets lined with cinchona, have been worn. Of all the modes of external application, only one is practised in the present day, or that of blistering the patient and afterwards sprinkling the part with the disulphate of quina, the curative effect of which, in severe forms of the disease, must be more than doubtful.

It will be seen from the occasional failure of crude bark, notwithstanding the use of many auxiliary modes of treatment, that although this medicine was a great accession to the materia medica, still that some further addition of power was a great desideratum. Many attempts had been made, at different times, to obtain this power by making a decoction of bark, or else by infusing it in cold water, in wine, or in spirits, so as to concentrate, if possible, the active febrifugal principle. But recent experience has shown that the kinate of quina, the state in which the active principle of cinchona exists in the bark, is little soluble either in hot or cold water, or in wine; or supposing the tartrate of quina to be formed in the latter menstruum, that it is also nearly insoluble, and must be precipitated. It appears, also, that

alcohol, though one of the most powerful solvents of quina, does not hold in solution more than about six grains to the ounce, and, consequently, that a drachm of the tincture, the usual dose, did not contain a grain of quina, a proportion evidently too small to greatly influence the course of severe disease. The discovery and isolation by Pelletier and Caven-  
tou, in 1820, of quina, one of the alkaloid principles of cin-  
chona, is not only one of the greatest results of chemistry, but has, also, laid the foundation of one of the greatest improve-  
ments in medicine, by enabling us to exhibit this active specific principle, freed from all the adventitious and especially woody matters, with which it is combined in nature. This substance has now been shown, by endless experiments, to be the real antidote to the paludal poison, when of such intensity as to produce intermittent fever, and has rendered all other modes of treatment, when the disease is not as yet complicated with organic lesion, unnecessary, at least, in London.

Quina sits easily on the stomach, even in large doses, and about five grains are esteemed an equivalent for one drachm of the crude powdered bark.\* There are two modes in which it may be exhibited, either in small and frequent doses and at short intervals, or else in one large dose once in the twenty-four hours. The latter seems the most preferable; for on a comparison of many cases

\* The quantity of quina obtained, varies according to the kind and quality of the cinchona employed. M. Pelletier originally regarded one grain of quina as representing a drachm of bark. Bories, in 1822, obtained nine grains from an ounce. In 1827, however, Pelletier obtained three drachms from a pound of yellow bark, or about two grains to an ounce. And still more lately, Henry, fils, has, by a new process, obtained four, five, and even six drachms from a pound of "quinquina calisaya," deprived of the epidermis, a quantity which averages five grains, nearly, to one drachm of crude bark. Thus, the price of this salt has continually diminished in proportion to the greater quantity obtained; so that looking to the smallness of the dose, the medicine cannot be considered as expensive. In France it is estimated at two liards a grain, and in this country the cost of the same quantity is generally less than a farthing.—Merat and Lens, Art. Quinine, p. 603, Dictionnaire.



treated by one, two to five grain doses, given every second, fourth or sixth hour, with others treated with ten grains in one dose every night, it has resulted that the one large dose has affected the cure of the patient in less time than double the quantity given in small and frequent doses. Thus, not only demonstrating that the large dose is more beneficial to the patient and more economical of quina, but also that the cure must be affected rather by the impression made on the nerves of the stomach than by the quantity absorbed.

The best practice, therefore, as well as the most economical in the cure of such intermittent fevers as are seen in London, is to give quina in large doses and at long intervals. The disulphate of quina is the preparation generally used, and is, probably, the best; and ten grains of this substance given every night, often stops the fever at once—more commonly, after three or four paroxysms, and always in the course of a very few days, and it is unimportant whether this medicine be given in pills or out of camphor mixture, or in solution, by means of dilute sulphuric acid, in the proportion of one drop to each grain of the salt. It is necessary, however, to add, that whether bark or quina be exhibited, or whether the dose be large or small, the patient should continue its use for a fortnight or three weeks after the last paroxysm, in order to guard against relapse; for the diseased actions appear to be *suspended* for some time before they are *cured*. It is desirable, likewise, in all cases where it is practicable, that the patient should be removed from every source of paludal miasmata, since in all the field operations of our armies on the continent, this class of patients were generally sent home, it being impossible to rely on them in making calculations of effective strength.

It was formerly a matter of much moment to determine the proper time for “throwing in the bark,” and whether it should be prescribed, not only during the apyrexia, but also during the paroxysm. The latter practice, however, has been generally reprehended, not only in the hot, but also in the cold stage. But it appears only objectionable from the greater irritability of the stomach at these periods, than

during the apyrexia, for where that circumstance does not exist, it may be given with impunity, if not with benefit. Formerly large numbers of these cases were treated with a drachm of bark every four or every six hours, both in St. Bartholomew's and in St. Thomas's Hospitals, without reference to the time of the paroxysm, and not only did no accident result from this exhibition, but the patients almost universally recovered. By exhibiting the disulphate of quina in one large dose, this question is altogether avoided, for in every case, the period of apyrexia may be chosen. It is most usual that the patient's tongue is clean during the apyrexia, but in a few severe cases, the tongue is seen heavily coated with a brown or white mucous; neither of these conditions, however, ought to deter us from an immediate exhibition of the quina, and the result is almost uniformly successful.

When intermittent fever becomes complicated with secondary affections of the paludal poison, so that inflammation of the peritoneum or of the pleura, or else dropsy of those membranes ensues, the treatment by quina must be either abandoned, or else modified. If inflammation be the result, local or general bleeding should be had recourse to, yet not to any extent, for as the inflammation depends on the agency of a poison, the utmost we can hope to effect by bleeding is to moderate the symptoms. This limited bleeding is to be followed by the exhibition of mercury, so as to affect the mouth. Five grains of calomel given once or twice in the twenty-four hours, is generally sufficient, but the quantity and frequency of the exhibition must be proportioned to the severity of the attack, and there are very few cases which do not yield as soon as the gums are affected. The beneficial effects of calomel\* are, indeed, so striking,

\* In speaking thus highly of calomel in the cure of intermittent fever and its consequences, the young practitioner should be guarded against an indiscriminate use of it. "I fear, likewise, that in this disease as well as in dysentery," says Sir James Macgrigor, "a state of debility is not unfrequently produced by the improper and nearly indiscriminate use of mercury."



that a much greater latitude may be allowed than in similar cases of simple phlegmasiæ, with respect to refraining from bleeding. A case was recently admitted into St. Thomas's Hospital of intermittent fever, with great tenderness of the abdomen, indicating a sharp attack of peritonitis. Ten grains of the disulphate of quina, together with five grains of calomel, were prescribed for this person, and she recovered without any accident, although blood-letting was entirely omitted.

If the secondary action of the poison produces merely disordered function of the serous membranes of the abdomen or chest, ending in dropsy, bleeding is unnecessary or injurious, while mercury is still the most useful and necessary agent, for few cases of paludal dropsy resist, in London, the action of five grains of calomel repeated every night till the mouth is affected; and this medicine is much to be preferred in these cases, to squills, elaterium, digitalis or any of the large class of neutral salts, and which are found so useful in more simple forms of dropsy. It is necessary, should intermittent fever and dropsy co-exist, that quina be exhibited in combination with the calomel, if otherwise, it is unnecessary.

When the paludal poison so deranges the functions of the liver as to occasion jaundice, mercury is still the only beneficial remedy; nor are large quantities of it necessary, for five grains of the *pilulæ hydrargyri*, or two grains of calomel every night, are, in general, all that is necessary to remove the complaint. In this case, should the febrile paroxysm continue, the one large dose of the disulphate of quina should be combined with the mercurial medicine.

It is unusual to meet in London in the present day, with intermittent fever accompanied by acute hepatitis or splenitis, so that few opportunities occur to enable us to determine the most satisfactory means of treating these diseases; but it is apprehended that bleeding and mercury, or mercury and the disulphate of quina, will, according as the fever is or is not present, be found to be efficient remedies. A female patient was admitted into St. Thomas's Hospital with quotidian

ague, œdematous legs and great pain in the region of the liver. Two grains of calomel and ten grains of the disulphate of quina were prescribed for this person, and in a few days, notwithstanding the exhibition of the tonic remedy, the hepatic affection disappeared, and she shortly recovered. When, however, the patient remains in the paludal district, and is hourly exposed to re-infection, chronic inflammation of the liver or spleen—frequently ensues, terminating in those strangely enlarged and disorganized masses of every size, colour and degree of consistency, which have been described. Many such cases returned to England after the Walcheren expedition, and very few recovered, whether treated by mercury or by other means. A great number of similar cases, also, returned to India after the Rangoon expedition, and were equally fatal. It seems, therefore, proper to speculate on the additional resources which modern chemistry has added to the *materia medica*, and the remedies which promise the most success in these intractable diseases, are the *potassii iodidum* and the *potassii bromidum*. A man was admitted, with an exceedingly enlarged and chronically inflamed spleen, into St. Thomas's Hospital. It was so greatly enlarged, that it passed the median line of the abdomen, and also descended low into the pelvis. The formation of this hypertrophied mass succeeded an attack of ague, and as he had been previously submitted to a great variety of treatment and was greatly emaciated, the case seemed utterly hopeless. Eight grains, however, of the *potassii iodidum* were directed for this person, and with such singular success, that the tumour rapidly decreased, till it was little more than one third of its former magnitude, and he acquired so great an increase of health and flesh, that we were unable any longer to keep him in the hospital, and this experiment has been, in a few instances, successfully repeated. The *potassii bromidum* appears to have still greater power in splenitis, when not originating from paludal poison, and in some few cases, it has rapidly subdued this most intractable disease. As the bowels of this class of patients are generally irritable, five grains of this medicine out of camphor mixture, have been found an average and an efficient dose, taken three times a day.



After the ague has been cured, there often remains a troublesome and protracted nervous hemicrania or painful affection of one side of the head, generally limited by the sagittal suture. But in the Peninsular War, this symptom appears to have occupied the occipital portion. "A symptom," says Sir James Macgrigor, "was found to remain not unfrequently after ague had been removed, with a great pain in the back part of the head, attended by a sense of fulness;" Dr. Buchan found that a return to bark cured this, after topical bleeding, cathartics and blisters had failed;" and this may be stated as the general rule of treatment for the removal of this most painful neurosis.

*Cure of remittent fever.*—Quina, bleeding and mercury, are unquestionably efficient remedies in the cure of intermittent fever, as well as of most of its consequences in all cases in which the patient has been early removed from the paludal atmosphere. It is to be much regretted, however, that all and each of these remedies have been found much less efficacious in the cure of the severe or remittent forms of the disease, yet as they are the most powerful agents we possess, it is desirable to ascertain their respective value, in the treatment of this class of disease.

It will have been seen that the ancients bled unsuccessfully in intermittent fever, and Sydenham, Morton and Cleghorn, also, abandoned that operation immediately on the discovery of bark. Bleeding, therefore, having failed in the mild forms, little could be expected from its use in the severe forms of the disease. The powerful arterial action, however, the great febrile heat, the occasional inflammatory affections of the stomach or other visera, and also the rapid, and frequently fatal course of remittent fever, have caused it to be extensively tried, and the following is the evidence of the little good it has effected, if not of its entire failure:—

"In the Walcheren expedition," says one of the medical officers, "I bled patients and saw others bleed them, but it was only to see them die." In the Rangoon expedition, bleeding was the favourite remedy, yet in less than three months, one half of the British force were laid in their graves. M. Maillot, speaking of the treatment of the French troops

now in occupation of part of the north coast of Africa, says :  
“ By large bleedings we brought about, very frequently, a  
“ remission in the continued affection, and at certain hours  
“ of the day, but more generally, in the morning, the pa-  
“ tients were better, the re-action being less strong ; still  
“ in the evening, the febrile phenomena presented all their  
“ greatest intensity, and depletion was again required. The  
“ patient was again relieved, but only transiently, and  
“ the following day, the same symptoms recurred with the  
“ same violence, and required once more the same treatment.  
“ These alternations did not last long, for one of two things  
“ happened, either the fever subsided and was converted into  
“ an intermittent, or else the fever became continued, and  
“ the patient, delirious or comatose, was carried off in a few  
“ hours.” And this latter so frequently happened, that M.  
Maillot abandoned the practice.

In the Gibraltar fever, 1828, Mr. Amiel\* says, “ General  
“ bleeding, which had been found useful in the epidemic  
“ of 1814, was resorted to from the first breaking out of the  
“ disease, in large and in small quantities, but with sanguine  
“ temperaments and under the most marked indications, I  
“ experienced no favourable result. I may add, that I have  
“ tried it occasionally at subsequent periods, and it never  
“ produced more beneficial effects.”

In the West Indies, in the year 1793, the French emigrants  
fled in large numbers to the English island of Dominica for  
protection, “ when the French surgeons,” says Dr. Clarke,  
“ fell into the error of bleeding, and all their patients died,  
“ while of those that placed themselves under the care of  
“ the English practitioners who refrained from bleeding, very  
“ few died.” Dr. John Hunter, whose opinion is entitled  
to every deference, says, that when the patient is young,  
strong and of a full habit, and lately arrived from Europe,  
the pulse quick and full, the face flushed with great heat and  
head-ache, and all this at the beginning of the fever, still  
bleeding did no good, it neither diminished the symptoms

\* Edin. Med. and Surg. Journ., p. 259.



nor produced a speedier remission. "I cannot say," he adds, "that it produced the mischief that has been attributed to it, for provided it was moderate in quantity, it could hardly be said to produce any ill consequence, but if it had been copious, it was always hurtful, and rendered the recovery of the patient extremely slow, if not attended with worse consequences." Sir Gibert Blane, also, says, "the utmost that can be said of blood-letting, is, that where there is a hard-throbbing pulse, with violent pain in the back and head, it is *safe* in the first twelve hours." "On our first acquaintance with this disease," says Dr. Gillkrest,\* "nothing would seem more plainly indicated than this remedy when the excitement runs high, but it has been too frequently found that after its employment, even but to a limited extent, as the Spanish practitioners express it, that the patient is speedily found to require all the strength that has been taken away. Frequently as we have witnessed blood taken from the arm, under a strong impression that a highly inflammatory action was going on, never has the blood, in a single instance, presented a buffy surface with a firm coagulum, it has, on the contrary, always formed a loose mass, yielding readily to the pressure of a finger, the serum separating imperfectly or not at all. It may here be mentioned, that our experience by no means bears out the assertions of some, as to the remarkably dark colour of the blood drawn from yellow fever patients. Without any intention to impugn the statements respecting the advantages derived from liberal venesection on particular occasions in the West Indies, it must be declared that the weight of evidence is against its general adoption in yellow fever, even when *prima facie* it would seem to be indicated." The valuable naval records at Somerset-house being rendered accessible for reference by the liberality of Sir William Burnett, some highly interesting observations on the point in question will be found in the reports from Mr. Linton, who has been long

\* P. 250.

resident in the West Indies, and for some time in charge of the Naval Hospital at Jamaica. Quite in accordance with our *ample* experience of the disease, as it appeared in the West Indies and Gibraltar, this gentleman declares the disease is “decidedly not inflammatory, though inflammatory symptoms may concurrently or adventitiously take place, and states, that in the records extending back for many years, the mortality was very great from the depleting system.”

On the Coast of Africa, where, perhaps, the severest forms of paludal fevers prevail. Mr. Boyle,\* says, “on my arriving at the colony of Sierra Leone in June, 1827, I was buoyed up with the hopes of success in my intended adoption of a more cautious and judicious use of the lancet, and I soon had ample opportunities of putting my views to the test, and the first remarkable instance is worthy of particular mention. Among a great many fever cases under my care, was the crew of the Thomas Gelston, a merchant ship, which had been about eight weeks on the coast, and loading with timber at the Sierra Leone river. The cases were brought on shore, and lodged in the same house. The captain having requested my attendance accompanied me, and in his presence, I bled six out of seven, in whom the febrile symptoms were the most marked. In the end, the whole of the seven died, but the most delicate, the one not bled, outlived the strongest of the others for the space of twenty-four hours. Apprehending that this fatality might have depended on some specific cause, I continued the system of bleeding still longer, limiting its application to such cases as had been very recently attacked, but with little success.”

The want of success that has attended the practice of bleeding in the hands of the profession generally, has not prevented many physicians from adopting it, and of forming a very different opinion of its value. Among these are Sir Wm. Burnett, Dr. Wilson and Dr. Proudfoot. Sir Wm. Burnett as physician to the Mediterranean fleet during the late war, bled largely and, he affirms, with success. Dr. Wilson treated



twenty-eight cases during a cruise in the West Indies by large depletion, and of these twelve died, a fearful proportion, he adds, of mortality indeed. The success of Dr. Proudfoot during the fever at Carthagera was more considerable, for out of 470 cases, only 76 died, or about one in six. But this gentleman is not an advocate for an indiscriminate use of the lancet, for he adds: "It is not to be inferred that he who draws off blood most early and most copiously will generally succeed, or even be the most successful. Blood-letting in the Spanish fever was commonly most useful when used moderately and discreetly. In many cases it was quite inadmissible."\*

It seems, therefore, that the advocates for bleeding in remittent and yellow fevers have not satisfactorily established their proposition, on the contrary, it is proved, according to the testimony of the great majority of the best practitioners of all countries, that as a general principle, bleeding to any amount is either inefficient or injurious in every form of paludal fever. Some depletion, however, as by cupping or leeches may occasionally be necessary to save a threatened organ, but bleeding carried to the extent which might be borne in the simple phlegmasiæ, seems quite unwarranted, not only by the laws of poisons, but by the experience of the profession generally.

The property which mercury possesses in controlling many of the secondary affections of intermittent fevers has caused it to be extensively employed in the cure of remittent and of yellow fever, but with extremely questionable success. In the Walcheren fever, this remedy was largely used and most fairly tried, yet it was admitted to have most egregiously disappointed the hopes of the medical officers. It appears, also, to have been used with equal profusion in the Rangoon expedition, and with what lamentable result has been already mentioned. When our troops re-embarked after the capture of Batavia. Mr. Wade gave from twenty-four to thirty-six grains of calomel in the twenty-four hours till salivation ensued. When this effect took place some remission followed, but no sooner did the gums heal, than the patients died almost to a man.

\* Edin. Med. and Surg. London, vol. xxviii. p 10.

In the West Indies, Dr. Chisholm has given as much as 6000 grains of this metal, internally and externally in a single case of yellow fever. This physician being a strong advocate for the use of mercury, had twenty-six artillery recruits placed under his care, yet labouring under West India fever; of these twenty-one died under the mercurial treatment, while of the five that recovered, two took very little mercury, and two others none whatever. Dr. Rush of Philadelphia, says, that “those physicians who depended chiefly on salivation in the cure of yellow fever lost more than one-half their patients.” Dr. Daniel gives the case, which he treated in the Savannah Hospital, of a patient labouring under a profuse salivation, being seized with remittent fever when the salivation subsided. The fever terminated in eight or nine days, and the salivation now returned in all its force with mercurial fœtor, swelled, salivary glands, tongue, &c. though not one grain of mercury had been administered after the accession of the fever. He is of opinion, therefore, that mercury given to produce salivation in fever, inflicts a real injury on the patient, for as long as the febrile action is violent, the mercurial action does not take place. The moment, however, the former abates, the latter is established, and from this time continues to retard the convalescence of the patient. Notwithstanding this evidence against the utility of mercury when used largely in remittent fever, it must be admitted that there is a strong feeling in favour of its exhibition, but certainly, the particular facts which should demonstrate its power and efficacy are by no author satisfactorily stated.

Bleeding and mercury, either separately or conjointly, having been proved to be inefficient, crude bark was very generally used between the tropics in the cure of remittent fever. Many practitioners who thought that bleeding reduced the vital powers and hurried on the malignant symptoms, prescribed it during the paroxysms, as well as during the remission, while the greater number gave it during the remission only. It is disputed which practice was the most beneficial, but it is asserted that a greater number of recoveries took place under them than under any other mode of treatment



in which bark was not used. Still, however, the great irritability of the stomach often causing it to be rejected in every stage, rendered the administration of the remedy inefficacious or impossible in a great number of cases, and the life or death of the patient turned on the quantity of wine and other nourishment that could be got down during the remission. The introduction of quina, has, however, wrought a greater change in the treatment of this disease, than any other remedy ever introduced into the *materia medica*. No where has this change been more manifested than in India, where it has created a completely new epoch in the treatment of fever of every kind, but especially of remittent fever. The immense power of quina in preventing the return of the fits of ague, and the ease with which it is retained on the stomach, induced medical men to try its effects in the remittent form, and they soon discovered, that it possessed the means of controlling that disease to an extent hitherto conceived impossible. In the West Indies, also, it is now generally used, and its great powers admitted. All practitioners are agreed that it may be administered in the intervals of the paroxysm, and that when a complete remission, occurs, the disease is greatly in their power. Some, however, consider that it may be exhibited, not only during the remission but also during the stage of pyrexia. M. Maillot, surgeon of the French army in the occupation of the North of Africa, not only recommends unusually large doses of quina, and at distant intervals, but affirms it may be administered in any stage of the fever. He admits it may be preferable to prescribe this medicine during the remissions only in temperate climates, yet he considered the application of this doctrine to the fever of hot climates, to occasion a delay so dangerous, that he recommends quina to be exhibited during the pyrexia as well as the apyrexia. This gentleman states that he treated 295 cases of remittent fever occurring in the troops around Bona in the following manner, and that the loss was only twelve or one in twenty-four. A soldier of the fifty-ninth regiment, twenty-five years of age was admitted on the 8th of August, with an exceedingly acute attack of remittent

fever, (gastro-encephalitis,) "I prescribed," he adds, "immediately one bleeding of sixteen ounces from the arm, and twenty leeches, and over the tract of the jugular vein. On the following day, there being an incomplete remission, I ordered twenty-four grains of the quinae disulphas to be taken immediately, and in one dose; a complete state of apyrexia took place during that day. The next day, the same dose was repeated and the patient rapidly recovered. In subsequent cases," he adds, "I gave the quina immediately after the venesection, and in certain cases, without having recourse to any depletion, having observed that many of the men had died of pernicious paroxysm, immediately after opening the vein." In bad fevers, he carried the dose much beyond what has been mentioned, of which the following case is an example.

An artilleryman, aged 27, strong and of a good constitution having recovered from the endemic affection, had left the hospital only a fortnight, when he was brought back in a state of profound coma, caused by a quotidian fever. At one o'clock, forty grains of the disulphate of quina were given to this man, as also sixty grains more in an opiated enema, and under this treatment the coma diminished. In the evening, he was able to open his eyes, but not appearing to understand what was passing around him, cold was ordered to his head, and another dose of twenty-four grains administered. The following morning, the coma was gone and the man recovered. In this case, one hundred and forty-eight grains of quina were exhibited by the mouth or by the rectum in twenty-four hours. Eight other cases were afterwards treated in the same manner and they also recovered. These large doses of quina, he adds, never produced engorgement of the viscera, dropsy, diarrhæa or other unpleasant sequelæ. By this treatment, also, the deaths which had been to the admissions in 1832, as 449 to 4053 or about one in nine; and in 1833 as 1526 to 6074, or about one in four and-a-half, were reduced in 1834-5 to about one in twenty-two, the deaths being to the admissions as 538 to 11,593. The different degrees of severity of the same fever in different years will not permit an entire confidence in these results until confirmed



by further experience. The experiment, however, is bold, and as the greater value of one large dose over many smaller ones of twice the aggregate quantity has been established in the cure of the mild fevers of this country, it deserves to be repeated. It must be admitted, however, that enormously large doses have occasionally been spontaneously taken by the patient in the West India fever, and without any corresponding successful result. The more usual manner of treating remittent fever in the West Indies, at least in Demarara, is by exhibiting one or two grains of the disulphate of quina every hour, or every two hours during the remissions, and in the higher classes of washing it down by a glass of champagne, when the stomach is irritable.

Such are the unsatisfactory results of these three great remedial means in the cure of remittent fever. It is, perhaps, more common in the present day to combine them than to use them separately, or to commence the cure by one moderate bleeding, using calomel as a purgative, and quina during the remissions. It is indeed necessary to attend to the *primæ viæ*, for costiveness generally precedes and accompanies remittent and yellow fevers, causing morbid irritability of the stomach and aggravating the affections of the head. Calomel with scammony, jalap, gamboge, or other similar purgatives, in the opinion of Dr. Bancroft best answer the purpose, and they should be so given, as to produce two evacuations daily, but not diarrhæa, lest they reduce the patient by the excess of the evacuations. The sickness and irritability of the stomach which generally attends this fever, renders emetics, nauseating remedies or sudorifics objectionable. The rest of the treatment consists in the exhibition of some of the great class of neutral salts, either in a state of effervescence or otherwise, of local bleeding, and of the application of cold or blisters to the head during the pyrexia at the discretion of the practitioner. In the intervals, the disulphate of quina should be given in as large and frequent doses as the stomach will bear. The auxiliary treatment is to support the patient during the apyrexia with wine, brandy, strong broths, or other nutritious diet.

In conclusion, looking to the curative means we at present

possess, and the possible results of their use, either separately or combined, it seems probable that remittent fever follows the laws of most other diseases inflicted by morbid poisons, and for which we possess no specific antidote ; or that when mild, it will readily yield, whatever moderate treatment be adopted, and whether it be directed to relieve congestion, to support the strength, or merely to alleviate symptoms. On the contrary, if the disease be severe, a large mortality will ensue, however judicious the application of the different remedies may be. In the Gibraltar fever, for example, bleeding was the first remedy employed, and quickly abandoned. Calomel was then resorted to with mercurial inunction. In the town, however, the Spanish physicians avoided bleeding and used no mercury ; abstained from quina as from a poison, and only sparingly employed æther, relying almost entirely upon mild purgatives and enemata ; and the proportionate mortality, under these opposite systems, was as one in six in the town, and one in four and a half among the troops. So that, making allowance for the number of women and children treated in the town, the mortality from these opposite systems is, perhaps, nearly equal.

In the West Indies, the same results have often been obtained by the most different and opposite modes of treatment in mild forms of fevers, while in severer forms, every mode of treatment has failed. Thus, in 1817, Dr. Arnold was able to report to the Deputy Inspector of hospitals :—" Our  
" fevers, for the most part, have been mild ; those that were  
" inclined to be severe, have yielded to a plan of treatment,  
" at once decisive but effectual, and as yet no case has terminated fatally. Such patients as came immediately under  
" the prompt and rigorous treatment, were young, plethoric  
" fellows, whose complaints, in the first stage, were head-ache,  
" dimness of sight, pain in the back, loins and shoulders,  
" furred tongue, strong pulse, from 100 to 120. These  
" cases were bled to twenty-four and some to forty ounces  
" before syncope took place, mercurial cathartics and blistering constituted the treatment, and with the most happy



“ results, for the second (attack) stage was cut short, and “ left but little to do in the subsequent stages.” On the contrary, in the fever of 1815, in which “ bleeding could not “ be carried to the extent recommended by some practitioners,” the average deaths were “ one in four.”\* This gentleman advocates bleeding in tropical fever, but he so guards himself in laying it down as a general rule, that it is not difficult to perceive great doubts must exist even in his mind on this point of practice ; for the patient is only to be bled at an early period of the disease, since delayed, “ it has often produced such terrible effects,” and “ many have been ushered to an untimely grave by this remedy untimely performed.” The patient, likewise, is not to be bled, or with great caution, if cachetic or of a phlegmatic temperament, or if in the early stages of this fever he has diminution of strength, singing in the ears, *sadness*, fear, vertigo or trembling of the limbs. It is an axiom, likewise, not to bleed if the skin be moist, and if the pulse yields readily to the impression of the finger, with anxiety and prostration ; for such patients, if bled, although young and robust, “ sink, frequently, to rise no more.” We all, however, know the mortality from fever in the West Indies, and even when our best exertions have been used, it is impossible not to exclaim with Dr. Arnold : “ What man is there who would not give the worth of India’s “ richest gem to possess the power of arresting the rapidity “ with which this disease advances—to check, as it were, “ the overwhelming force (with) which (it) too often hurries “ his patient from this world to the realms of eternal repose, “ whilst in the full tide of life !” It is gratifying, however, to learn that the disease is better understood, and the loss of life comparatively small to what it was in former years.

*Dietetic treatment.*—There is something extremely inimical in an animal diet in every case of disease from a morbid poison, and, consequently, though broths may be useful and necessary during the intermission or remission, the diet of the patient from the commencement till the termination of the

disease, whether remittent or intermittent, should be strictly antiphlogistical and limited to a milk diet, slops, and vegetables. In all cases, also, where the health and circumstances of the patient will admit of it, he should be immediately removed from the atmosphere in which he has contracted the disease.

*Preventative treatment.*—The question of prevention necessarily involves the doctrine of the contagious nature of paludal fevers generally. The milder forms of paludal fever are certainly not contagious, for the London hospitals often contain a considerable number of cases of intermittent fever, yet in no well authenticated instance, has that disease been known to spread to any patient in the ward, or to any medical or other attendant. On the return, likewise, of our troops from Walcheren, labouring under every grade of remittent and intermittent fever—not one orderly, nurse, or medical attendant suffered from either of those fevers, who had not been previously exposed to the causes of this disease. The contrary, it will be remembered, of what happened when they returned suffering under typhus from Spain.

In the West Indies it is the common practice to send convalescents from the towns to the mountains, but no instance is known of yellow fever spreading in those higher districts. The hospitals of Jamaica were often, in the times of Dr. John Hunter, so crowded, that the sick were placed in double tiers, one over the other, yet although three-fourths of the patients laboured under fever, no instance is known, says that intelligent physician of a patient, admitted for any other disorder, taking the fever. In Dominica, during the time Dr. James Clarke, superintended the hospital of that island, no physician, surgeon, or nurse connected with that establishment was seized with fever. At the Antigua hospital, also, patients admitted for wounds, ulcers, &c. slept in contiguous cradles to those affected with fever, but says Dr. Veitch, “during the  
“whole time I did duty at that hospital, my assistants and  
“myself were oftentimes sitting in the midst of ten or twelve  
“fever cases. yet no one caught the disease. My assistants,  
“also, frequently took possession of the cabins appropriated to



“sick officers when unoccupied, but without suffering any inconvenience.” Again in the years 1796, 1797, when the army under Sir Ralph Abercrombie suffered dreadfully in the West Indies from fever, the inspector-general reported to the army medical board the opinions of the medical officers on the staff on the subject of contagion, and that report states, “contagion or infection has had little or no share in the mortality, and I must beg to add, that it has never occurred in a single instance to my observation.”

Dr. Bone who resided many years in the West Indies, states that “the first important result which I have proved in the naval hospital, (Barbadoes,) is that *yellow fever*, as it is called, cannot by possibility, be communicated from one person to another,” and he concludes, by observing, that so few in the West Indies believe in the doctrine of contagion, that they may very safely be permitted to enjoy their own opinions.” Dr. Fergusson also says, that at Martinique, they established a strict quarantine, particularly directed against Guadaloupe, where they had been consumed with yellow fever, but at St. Domingo, Tobago, St. Vincent, &c. where they established none at all, “they have not in as far as I have learnt had a single case, although at the last mentioned islands, both the Tigris and Childers ships of war, imported distinct and well marked instances of the disease from *Point au Pietre* on the evacuation of Guadaloupe.”

The yellow fever rages in some parts of the East Indies as well as in the West Indies, and after the storming of Seringapatam, it broke out among the troops in possession of that town, yet although the hospitals were greatly crowded, still it did not spread to any orderly or patient labouring under other disease. Mr. Annesley, also, in his history of the diseases of India, says, “we have never remarked any appearance of fever from a specific or contagious source in India.”

The evidence of the non-contagious nature of these diseases is equally strong on the continent of America. In the United States, the fever hospitals have been built two or three miles in the country, and entirely beyond the local contaminated atmospheres of their respective cities. But in

none of these establishments is there a single example of a person employed about the yellow fever patients being attacked with this disease, unless he had been previously in an infected district. This appears to be so absolutely the case, that the President of the United States announced to both Houses of Congress in 1805, that “in the course of the several visitations of this disease, it has appeared that it is strictly local, incident to cities and tide waters only, and incommunicable in the country, either by persons, or by goods.”

On the coasts of the Mediterranean, the non-contagious nature of this disease is proved in an equally remarkable manner. When the yellow fever raged at Florence, from eight to 10,000 of the inhabitants fled to Pisa, and to the towns and villages of Tuscany generally, and commerce though interrupted, was not suspended, still the fever did not spread. At Gibraltar, also, after the experiment of isolating the infected portion of the town on the principle of contagion had failed, encampments for the troops were formed on the neutral ground. Among the many thousand persons thus encamped, the disease immediately ceased, while multitudes were perishing within the walls; their friends, the inmates of the same house, and often partners of the same bed, and with whom the freest communication was kept up. “It was shown,” said Dr. Gillkrest,\* “that the morbid influence was limited to the western face of the rock, and to a small village occupied by fishermen, and to a small military post situated at the base of the rock at its eastern side.”

Also, when the disease raged at Sierra Leone, on the coast of Africa in 1829, the medical officers of that colony were called upon to report to the lieutenant-general as to its contagious nature, when they declared, “there is not the slightest ground for the rumour that contagion exists in the colony.”†

Among other proofs of the non-contagious nature of these fevers, is, that of the disease not being communicated by *fo-*

\* P. 296.

† Boyle's Western Africa, p. 26.



*mites*; for the apparel worn by patients labouring under yellow fever has appeared to be equally innocuous with their persons. According to Drs. Lehman and Mease of the Lazaretto of Philadelphia, immense quantities of bed-clothes, pillow cases, and similar articles stained with blood, black vomit, and other evacuations have been touched, handled and washed by the attendants or other persons without the smallest inconvenience. Beds, also, on which the yellow fever patients have died, have, still unpurified, been occupied by patients in health without any unpleasant result. When the yellow fever raged at Philadelphia in 1793, many persons sent from the Bush-hill Hospital, were placed in the same wards with the fever patients, were served in common with them, often occupied the same bed, from which a few minutes before, a fever patient had been removed, still none of these persons took the disease. At this critical period, the French refugees arrived in crowds from the West Indies, and as many as the Bush-hill Hospital could accommodate, were sent there, and they often occupied the same beds with the fever patients, yet not one caught the disease. At length the entire hospital, without the ordinary precaution of white-washing was given up to these persons, nevertheless, not one case of infection occurred.

Many physicians, surgeons, and nurses have received the matter of the black vomit on their clothes, and hands, and face, without suffering in consequence. In Guiana, the Antilles, the United States, Africa, and on the coasts of the Mediterranean, many hundreds of bodies deceased of the yellow fever have been inspected with impunity, notwithstanding the operators immersed their cut hands in the fluids. As an ‘*experimentum crucis*,’ Dr. Frith of Philadelphia inoculated himself in the presence of several medical men, with the matter of the black vomit just thrown up by a moribund patient. A slight inflammation followed, but it subsided in three days, and no further consequence ensued. He then confined some recently vomited black matter, by means of sticking plaister over his right arm for two days, and he repeated this experiment in various parts of his body more than

twenty times, but without effect. He next applied some of the black matter to the conjunctiva of the eye, but did not experience more inconvenience than from cold water. The black vomit failing to produce any effect, he next tried the saliva and serum of the blood taken from a yellow fever patient, but these inoculations were equally harmless. He after this heated some of the black vomit in an iron vessel, and stood over the vapour—then made the inspissated matter into pills, and swallowed them, and lastly, drank two ounces of the recently vomited black matter, *neat*, having previously taken considerable quantities of it diluted with water. And these experiments have been repeated by Guyon of Martinique, by Drs. Prost and Dorsey of South Carolina, O'Connor of Trinity Island, by Govin of the Havannah, and by Chervin of Paris, and without their sustaining the smallest injury.

*Evidence of contagious nature.*—The evidence for the contagious nature of paludal fever, is principally derived from a popular belief in Spain, where it is the practice, on the breaking out of this formidable epidemic, to isolate the inhabitants of the infected city by means of cordons of troops. In this manner, separation is prevented, and the solution of the problem rendered impossible. The other facts on which this doctrine rests, are principally ship cases. When remittent fever breaks out on board a ship, the doctrine of contagion is not necessary to its explanation, for supposing the ship to have recently sailed from a tropical port, the time that the poison may lay latent, will readily explain the appearance of fever at sea, even many days after the vessel has cleared the land. But paludal fever may also arise from causes existing within the vessel herself, of which the *Priamus* frigate is a striking example.

Another instance occurred in 1794, when the *Bedford*, a seventy-four gun ship, arrived at Gibraltar from the Mediterranean. The garrison was healthy, but in the course of a week, one hundred and thirty men were sent on shore with fever. In this case, the only feasible source of the poison appeared to be the shifting of the shingle ballast, with a view to trim the ship. The *Regalia* transport was employed in



carrying black recruits from the coast of Guinea, in 1816, to the West Indies. The crew were in good health previous to taking in many tons of green wood at Sierra Leone. After this, great sickness, dysentery chiefly, prevailed during the voyage among the blacks, while the crew laboured under yellow fever, many of them dying at Barbadoes and Antigua, without communicating the infection to any of these places. These are strong confirmations of the doctrine, that the causes of yellow fever often exist on board the ships themselves, but not of the contagious nature of the disease; and it should be remembered, that ships from tropical countries generally return loaded with vegetable matters, as sugar, cotton, coffee, indigo, Indian corn and other products of those climates.

Yellow fever has sometimes broken out in ships in harbour as well as in ships at sea, as in the case of a brig named the *Donostiarra*, in the Port du Passage in Spain, in 1823. But a dirty ship in harbour is often in a worse state, as relates to the production of disease, than when at sea. For the atmosphere, owing to the surrounding land, is hotter, and the vessel, also, is less frequently pumped, so that the vegetable debris in the hold, are, consequently, in a much more favourable state to run into rapid decomposition.

Few British ships of war, it has been observed, continue eighteen months on the Jamaica station without an attack of fever, and as these vessels are now ballasted with iron instead of shingle or gravel, and as great attention is paid to cleanliness, the cause has been anxiously investigated. Dr. Wilson, however, is of opinion that, notwithstanding these precautions, it depends on local causes, as the decomposition of the ship's timbers; for in the majority of cases, it begins in the vicinity of the pumps and main hatchway, where the shell of the ship is most dependent, so that the water from all other parts of the ship collects at that spot, and here, also, the heat is the most intense. On either side of the main hatchway and pumps, in frigates, are the births of the midshipmen and marines, and in those situations, the disease almost invariably first appears and commits the greatest ravages—at least, such was the case on board the *Isis*, the

Lively and the Rattlesnake. Its after progress appears connected with the manner in which the ship is trimmed, or with the inclination of the keel from a horizontal position. When a ship, for instance, is so trimmed that the fore part becomes the most dependant, the disease spreads in that direction ; but in brigs, where the stern is lowest, it generally spreads aft. It is, also, generally observed, that those men who sleep and pass most of their time on the main deck, are seized later and more slightly than those who live and sleep chiefly below.

The doctrine of contagion has been supported by some nosologists, on the ground that typhus and paludal fevers are merely different species of one common genus. A short comparison, however, of the laws of the two diseases, will shew differences perfectly irreconcilable with such a hypothesis. Paludal fevers increase in intensity from the Pole to the equator, their severest forms not being seen in higher latitudes than  $43^{\circ}$  to  $46^{\circ}$ . Typhus fever, on the contrary, decreases in intensity from the pole to the equator, for in tropical regions, according to some high authorities, it is absolutely unknown. A temperature from  $80^{\circ}$  to  $85^{\circ}$  is necessary for the production of miasmata, occasioning yellow fever, while that degree of heat is destructive of the contagion of typhus. Paludal fevers, also, are connected with a given locality, while the range of typhus is unlimited, for it equally devastates the mountain and the plain, the marsh and the drained city. The persons most liable to paludal fever, are the robust and healthy ; typhus attacks the feeble and those that are ready to sink with want and misery. In the symptoms of the two diseases, there is the essential difference between remission and continuity. The pathology of the two diseases is also different, for the secondary actions of the paludal poison affect the liver, the spleen, and the peritoneum, while the typhoid poison affects more commonly the lungs, the preceding viscera being in no instance diseased. With respect to the alimentary canal in remittent or yellow fever, the poison acts principally on the stomach and duodenum ; but in typhus, the principle seat of the disease is the ileo-cæcal valve ; inflammation of the stomach and duodenum



being the exception. Neither is there any affinity between these diseases in their modes of cure, for we possess a specific remedy for the milder forms of the one, while, unhappily, in the treatment of the other, we have only general principles to guide us. As there is no ground, therefore, for the doctrine of the identity of typhus and of paludal fevers, so the contagious nature of the latter cannot be supported by an appeal to that or, perhaps, to any other hypothesis.

The only preventative treatment, therefore, is to avoid those localities which engender the paludal poison; and in Rome, this precept is so well known, that the wealthy inhabitants leave that city during the summer to reside in the country; while in Jamaica, from July to October, the only chance of avoiding an attack in certain districts, is an early removal to the high mountain residences of the interior. If, however, change is impossible, and we are obliged to reside within the range of the miasmata, we ought not to expose ourselves to the night air, especially those who have suffered from the disease, for the tendency to relapse is great. It should be remembered, also, that a relapse commonly takes place on days corresponding to the paroxysm; hence great caution is necessary to avoid exposure to cold, fatigue, improper diet, easterly winds, great mental anxiety, or the indulgence of passion on the recurrence of those days. Europeans, also, embarking for tropical countries, should so arrange their voyage as to arrive during the healthy season, that they may have the advantage of being in some degree *acclimatée*. This period, of course, varies in different latitudes, but in Jamaica, or any other of the West India Islands, January is the month said to offer the greatest advantages, and, indeed, to be the only proper period for preparing the system for a residence in that climate. The autumnal season is the sickly season, and, consequently, under any circumstances, is that period of the year when European constitutions are most liable to paludal fever. These precautions, undoubtedly, diminish the chances of attack; but the only true prevention is drainage, or where that cannot be affected, the keeping the waters of the marsh up to a given level, by means of flood gates or other mechanical contrivances.

## DYSENTERIA PALUSTRIS.

Dysentery is a specific inflammation of the mucous membrane of the colon caused by the paludal poison. The duration of this disease is from a few days to many months.



The first of these is the fact that the  
government has been unable to  
obtain the necessary funds to  
carry out its policy.

The second is the fact that the  
government has been unable to  
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## OF THE PALUDAL POISON.

### DYSENTERY.

It has been seen that the paludal poison, according to its intensity, produces the various forms of intermittent, remittent, and of yellow fevers. But so singular are the laws of this noxious agent, that fever is not the only disease which it inflicts on the human frame; for owing, perhaps, to some modifications either of quality or quantity, the miasm also gives rise to dysentery, a disease whose course and phenomena are frequently unaccompanied by any febrile symptom whatever. It is doubtful, indeed, if the morbid actions of the poison end here, or whether many forms of hepatitis\* and of splenitis ought not to be referred to its baneful influence. It is now intended, however, to treat of dysentery only. The peculiar modification of the quantity or quality of the paludal poison which produces this form of disease, is unknown, but the connection of dysentery with paludal fever and paludal districts, is supported by the most abundant and irrefragable authorities.

*Remote cause.*—It may be stated as a general proposition, that there is no country where paludal fever exists, that dysentery is not an endemic and a prevailing disease. In

\* Dr. Arnold, when speaking of Port Antonio, says :—“ In this as well  
 “ as in many other parishes in Jamaica, the diseases when most virulent,  
 “ have the character of remittents, when less so, they are intermittents,  
 “ presenting all the variety of quartan, tertian and quotidian; the latter  
 “ are frequently obstinate, chiefly affecting children from the age of three  
 “ to ten years old. Towards the end of the year, in certain districts,  
 “ malaria, of a quality somewhat different, will produce *hepatic affection*  
 “ and dysentery, frequently very obstinate, the latter sometimes epidemic.  
 “ (p. 179). In other parts of this district, Dr. Arnold also speaks of  
 “ *splenitis* being common.”



the East and West Indies, China, the Ionian Islands, Gibraltar, Malta, the Canadas, Holland, the coasts of Africa, as well also in many different parts of France, of the Peninsula, of the continent of America, and of the eastern parts of Great Britain, the prevalence of intermittent fever and of dysentery is notorious. This connection is so intimate, that of a given number of persons exposed to the action of paludal miasmata, as a boat's crew sent ashore in a tropical climate, the probabilities are, that on the men returning on board, part will be siezed with dysentery and part with remittent fever. The following table, however, will best show how certainly dysentery and paludal fever prevail in the same malaria districts.

FEVERS AND DYSENTERY IN THE MADRAS ARMY FOR A PERIOD OF SIX YEARS, FROM 1815 TO 1821.

	FEVERS.		DYSENTERY.	
	Europeans.	Natives.	Europeans.	Natives.
Presidency per 100 men mean strength annually . . .	30 $\frac{4}{10}$	16 $\frac{6}{10}$	47 $\frac{3}{10}$	1 $\frac{9}{10}$
Southern Division . . .	28 $\frac{3}{10}$	18	33 $\frac{9}{10}$	1 $\frac{8}{10}$
Centre ditto . . .	27 $\frac{5}{10}$	16 $\frac{6}{10}$	38 $\frac{1}{10}$	2 $\frac{3}{10}$
Northern ditto . . .	13 $\frac{5}{10}$	29	12 $\frac{9}{10}$	1 $\frac{3}{10}$
Travancore ditto . . .	5 $\frac{5}{10}$	6 $\frac{4}{10}$	16 $\frac{8}{10}$	$\frac{7}{10}$
Mysore ditto . . .	26 $\frac{8}{10}$	46 $\frac{9}{10}$	22 $\frac{4}{10}$	2 $\frac{3}{10}$
Ceded districts . . .	24	20 $\frac{2}{10}$	30 $\frac{4}{10}$	1 $\frac{8}{10}$
Field force . . .	18 $\frac{5}{10}$	32 $\frac{7}{10}$	24 $\frac{9}{10}$	3 $\frac{6}{10}$
Hyderabad subsidiary force .	33 $\frac{9}{10}$	30 $\frac{4}{10}$	36 $\frac{7}{10}$	5 $\frac{9}{10}$
WEST INDIES.	White troops.	Black troops.	White troops.	Black troops.
Windward and Leeward command . . .	71 $\frac{7}{10}$	16 $\frac{8}{10}$	20	9 $\frac{3}{10}$
Jamaica command . . .	91		10 $\frac{1}{2}$	
Gibraltar . . .	16 $\frac{1}{10}$		4	
Malta . . .	17 $\frac{3}{10}$		3	
Ionian Islands . . .	45 $\frac{7}{10}$		5	
Nova Scotia and New Brunswick . . .	6 $\frac{3}{10}$		1	
Upper Canada . . .	28 $\frac{5}{10}$	}	2 $\frac{2}{10}$	
Lower Canada . . .	16 $\frac{5}{10}$			

These data might be greatly extended, but they are suf-

ficient to prove that dysentery and intermittent fever originate and are almost limited to the same given locality, and, consequently, must be caused by the same poison acting on different constitutions. Paludal fevers and dysentery, moreover, are not only conjoined in locality, but they also may co-exist, precede, or follow each other in the same individual. Dr. John Hunter, who had satisfied himself that the dysentery which prevailed in London, in 1779-80, differed in no respect from that which he had witnessed in Jamaica, says that the two diseases are often complicated, and that in some cases, the dysentery ends in fever, though it much oftener happens that fever terminates in dysentery, especially among soldiers in the army. This proof of the intimate nature of these diseases is corroborated by every writer of any celebrity, and more especially by those who have detailed the diseases of our armies. Sir John Pringle, after stating that the cause of intermittent, remittent fever and bloody flux are similar, proceeds:—"Nay, the affinity extends to the  
"occasional or exciting causes, such as when the men are  
"exposed to night fogs and damps, especially after a hot  
"day, or lie upon wet ground, or in their wet clothes, for  
"part of them will be seized with that kind of fever, and  
"part with this flux, and, perhaps, some of them will have a  
"disease compounded of both." During the Walcheren expedition, the British army was destroyed by intermittent fever and dysentery, either separately or conjointly. The same connection was observed in the Peninsular war; for Sir James Macgrigor, in his account of the diseases of the British army in Spain, says:—"I introduce it (dysentery)  
"after intermittent fever, because the two diseases were  
"found so generally connected in the Peninsula, and inter-  
"mittents were found to terminate so frequently in dysen-  
"tery."\* When Egypt was occupied by the French, intermittent fever and dysentery were observed often to succeed each other in the same person. While in the Rangoon expedition, dysentery of a most irremediable description, swept

\* P. 420.



off the greater part of those who survived the fatal remittent and intermittent fevers of that pestilential country.

The intimate nature of cause and effect, between paludal fever and malaria, was shown not only by the prevalence of those diseases in paludal districts, but also by their disappearing in proportion as the country was rendered dry by drainage. This converse of the proposition can also be shown of dysentery. In London, for example, before the great fire in 1666, the mortality from dysentery was never less than 1,000, and in some years exceeded 4,000 annually. In proportion, however, as the drainage of this great capital has been perfected, dysentery has gradually disappeared, till it has entirely ceased to be endemic, and even a sporadic case is now of rare occurrence.

It seems, then distinctly proved that dysentery and paludal fever equally originate in low and marshy districts—that they both equally disappear in proportion to the improved drainage of those districts, and also that they frequently co-exist or else alternate in the same person; and, consequently, it follows that dysentery is a disease of a specific nature, and originates in some peculiar modification of the paludal poison. It seems, also, determined that dysentery prevails in the inverse ratio of the intensity of paludal fever. In Jamaica, for example, where the white troops suffer from fever in the larger proportion of ninety-one per cent annually, the cases of dysentery to fever are only as one to nine; while in the Madras presidency, where the troops suffer from fever in the much less ratio of only thirty and four-tenths per cent. annually, the cases of dysentery are to those of fever as forty-seven of the former to thirty of the latter. It appears, also, that dysentery is less common in the hotter than in the colder months, or appears under circumstances apparently less favourable to vegetable decomposition. Thus in India and China, it is from the middle of November to the latter end of February, when remittent changes into intermittent fever, that dysentery greatly prevails.

Another remarkable circumstance is that when Lon-

don began to be extensively drained, intermittent fever disappeared much sooner than dysentery in the metropolis. Endemic intermittent fever was hardly known in London after the great fire in 1666; while from 1667 to 1692, a space of twenty-five years, dysentery destroyed more than 2,000 persons annually; a number which, notwithstanding the large additional population, has continued to fall, till in the last decennial space of the eighteenth century, it hardly amounted to twenty annually. In Upper Canada, also, where intermittent fevers were formerly so common, it has been observed during the last five years from improvements in drainage and in agriculture, that class of disease has almost entirely disappeared, while, at least one-third of the troops have been attacked annually with diseases of the stomach and bowels.

*Predisposing causes.*—Our knowledge of these causes is principally derived from what occurs in the military or naval services, and from the sufferings of the troops we learn that exposure to the night air, to wet, or to fatigue, together with the intemperance and improper diet incident to soldiers generally, and especially when on active service in the field, have been at all times found to be powerful predisposing causes to dysentery.

On actual service, dysentery is among the most formidable and fatal diseases the troops have to contend with, so much so that it has been termed, “the scourge of armies.” The army of William the Conqueror is said to have been so inefficient from dysentery, that without the divisions of his enemies he would never have worn the British crown. The army of Henry V. was reduced by this disease from 59,000 men to 10,000 so that previous to the Battle of Agincourt it was the scoff of the French; and the troops with which Henry VII. won the battle of Bosworth Field were not in a much better condition.

In modern times dysentery has proved nearly equally fatal to armies when on active service. When the Duke of Marlborough marched at the head of the British army into Germany to the assistance of Austria, then attacked by the French, the troops had suffered so little on



the march that the sick were to the healthy as one to twenty-nine. "On the 26th of June, however," says Sir John Pringle, "in the evening the tents were struck, the army "marched all night, and on the following morning, fought "the Battle of Dettingen. That night the men lay on the "field of battle, without tents, exposed to a heavy rain. "Next day they marched to Hannau where they encamped "in the open field and on good ground but it was wet, and for "the first night or two they wanted straw. By these accidents "a sudden change was made in the health of the army. In "the space of eight days after the battle, about five hundred "men were seized with dysentery, and in a few weeks nearly "half the men were ill or had recovered from it."

The French army in Egypt, much as it suffered from the plague, suffered still more from dysentery, the former disease destroyed only 1689 patients, by the latter they lost 2468 or a large proportion of the whole force. The division which suffered most was that under the command of General Dugua quartered in the environs of Massourah. It had followed the enemy to the desert, and during the forced marches it had made, often wanted the necessaries of life, but still continued in health. On retracing its steps, however, it had to pass through places inundated with the overflowings of the Nile, and dysentery now made its appearance. The troops first caserned, suffered little, but those who lay exposed to the night air, suffered most severely.

In the Peninsular war, dysentery was the disease which caused the greatest loss to the British troops, 4717 men dying from this disease alone. The divisions which suffered most were the first, fifth, and sixth, being the troops employed at the siege of Burgos, the men being frequently for twenty-four hours together up to their middle in water in the trenches, sleeping frequently either in the open air, or in tents pitched on moist and wet ground.

The extent to which differences of constitution, habits and modes of life predispose to this disease may be seen by comparing the relative liability to dysentery of the European and native troops serving in India. The Hindoo is a polygamist

and so far a debauchee, but in other respects is abstemious, lives entirely on vegetables and is even laborious. On the contrary, the European serving in the East is indolent, drinks copiously of intoxicating liquors, and gives a full indulgence to all his appetites and passions, and we find he suffers in an infinitely greater proportion than the native sepoy who partakes of the same dangers, and divides the same duty with him. The result, indeed, as may be seen by the table, is that the British soldier is thirteen times more liable to dysentery than the sepoy.

In all countries, the nature of the *diet* is found greatly to influence the occurrence of dysentery. An immoderate indulgence in unripe grapes in the plains of Champagne is said to have decimated the Prussian troops on their invading France in 1792. At Gibraltar, diseases of the stomach and bowels are about twice as frequent and thrice as fatal, as among the troops serving in the United Kingdom; and in the opinion of the medical officers, this greater tendency is owing to the larger proportion of *salted provisions* issued to the troops, or on four days a week during the winter, and on two days a week during the summer; for the officers are but triflingly affected and the lower classes of the civil inhabitants of the rock, also, suffer much less than the garrison. The truth of this conjecture is still further shown by the experience of twenty years in the West Indies, for it has been ascertained in the windward and leeward command, where the rations issued to the troops consist of salt provisions, five days in the week, that the mortality from diseases of the stomach and bowels among the officers is as 2.4, while that among the soldiers is 20.7, or in a tenfold ratio. On the contrary, in Jamaica, where salt provisions are issued to the troops but two days in the week, the mortality from the same disease approximates so nearly between these two ranks as to be almost an equality.

The ration of the soldier, at present, consists of one pound of meat and one pound of bread daily. Fresh meat is generally issued on five days in the week, and salt beef or pork on the other two. But this has not always been the case. On the Gold coast, the troops were formerly altogether with-



out fresh meat, and that which was issued at Sierra Leone, or even on the Gambia, though better, was of very inferior quality. In consequence of proper representations, the issue of fresh meat was, in 1827, increased to five days in the week, and of late, the quality also has been very materially improved. It appears from the returns, that 504 per 1,000 mean strength have been under treatment in the Sierra Leone command annually, for diseases of the stomach and bowels, and that the deaths from these diseases averaged forty-one per cent. of the force annually. As usual, dysentery was the principal source of the mortality, and of so aggravated a character were the acute cases, that nearly two-fifths of them proved fatal, a degree of intensity, perhaps, never surpassed. The Sierra Leone commissioners, who possessed the best means of investigating the subject on the spot, were of opinion that the large proportion of salt rations had mainly contributed to the sickness and mortality; and the following statement of the marked reduction which took place in the deaths from this class of disease, immediately after the introduction of the fresh meat diet, which they recommended, shows their conclusion to have been well founded. For after an ameliorated diet, the mortality was reduced to one tenth of its former amount.

PREVIOUS TO ALTERATION IN RATIONS.						SUBSEQUENT TO ALTERATION IN RATIONS.					
Year.	Mean strength.	Diseases of stomach and bowels.		Ratio per 1,000 mean strength.		Year.	Mean strength.	Diseases of stomach and bowels.		Ratio per 1,000 mean strength.	
		Admitted.	Died.	Admitted.	Died.			Admitted.	Died.	Admitted.	Died.
1825	571	235	32	411	56	1828	232	139	1	600	
1826	471	256	26	543	56	1829	114	50	0	439	
1827	345	209	13	606	38	1830	42	22	1	524	
						to 1836					
Total	1.387	700	71	Average 505	51	Total	388	211	2	543	

At St. Helena, more than one third of the admissions, and nearly two thirds of all the deaths among the troops have been from diseases of the stomach and bowels; of these, dysentery is the prevailing form, and is even more severe than in the West Indies; yet in vain do we seek for any peculiarity in the climate or locality to account for it. In consequence of the repeated representations to which the

frequency of this disease gave rise, a board of medical officers was, in October, 1836, directed to investigate the subject, who came to the conclusion that the health of the troops had been manifestly impaired by the constant use of salt rations. Two days fresh provisions per week were, in consequence, ordered for the troops, with the privilege of exchanging a portion of their salt meat for fish or vegetables. The beneficial effect of this alteration was shown by the cases of visceral obstructions being reduced to half their previous amount in the course of the following year, and now they are said to be comparatively rare.

In the navy, the same effects of an ill regulated diet have been observed. "It cannot be questioned," says Dr. Wilson,\* "that the abundant and excellent provisions supplied  
"to ships of war, contribute largely to the high degree of  
"health now enjoyed in the royal navy. Formerly, a ship  
"of war was, on many accounts, an object of aversion; destructive disease under various forms being one—scurvy,  
"putrid ulcer, *malignant dysentery* and fever, allied to that  
"of gaols, suddenly swept off the greater portion of many  
"ships' crews, and well nigh depopulated fleets. In 1797,  
"the victualling was changed, greatly improved, and, consequently, immediate to the change, the health of the sea-  
"men improved strikingly. Scurvy, typhoid fever, *dysen-*  
"*tery* and ulcer, which up to the period of change had  
"produced great havoc, became comparatively rare in occurrence and light in impression. Some ships, in particular  
"circumstances, suffered from one or more of those diseases,  
"but the sweeping epidemics of former years, which often  
"rendered individual ships, and sometimes entire fleets,  
"totally ineffective, became unknown." Since 1797, various improvements have been introduced into the victualling of the navy; such as giving cocoa in lieu of gruel (burgoo) for breakfast, issuing salt meat at a much earlier period after being cured, the supply of better articles, and the substitution of tea for the afternoon allowance of spirits; and with every improvement in those respects, as a general result, has

\* Statistical Reports of the health of the navy, p. iii.



there been further improvement in health, till the *four forms of disease*, at no distant date so destructive, are scarcely known, except by name.

“ In the foremost place of individual causes,” says Dr. Cornuel,\* “ we must place *drunkenness* and an intemperate indulgence in spirits. I know that soldiers indulge in tafia without suffering from dysentery, but the abuse of spirits, when conjoined with local circumstances, produces colitis with such certainty, that I am almost sure to find the soldiers whom I have met intoxicated in the streets, after a few days, come into the hospital affected with dysentery. Indeed, at Basse Terre there is no constitution so robust that can escape dysentery without the practice of temperance. Every regiment arriving at Basse Terre, loses, in the first year, three fourths of those addicted to drinking, and the remaining fourth dies at no distant period afterwards, ‘ plus tard,’ ”

“ The destructive effects of intemperance,” says Dr. James Johnson, “ are equally conspicuous, for the injuries they create in Europe bear no proportion to those we witness in the East and West Indies. The truth of these observations is amply exemplified among the crews of ships, when they have liberty to spend a few days at Calcutta, or go on shore in any part of India where intoxicating liquors are procured. During the indirect debility succeeding to these debauches, the endemic of the country makes rapid strides among the deluded victims, converting what they erroneously believed to be an indulgence into the greatest evil that could have befallen them. In every region virtue is its own reward, but within the torrid zone, its breach is more signally punished than in any other.”

In general, climate and the irregularities of a soldier's life, greatly predispose to diseases of the stomach and bowels, of which dysentery forms the largest proportion, and is a most fertile source of sickness and mortality in the army serving abroad. In the windward and leeward command, the numbers attacked by these disorders amount to 421 per 1000 annually,

\* Mémoire sur la dysenterie observée à la Basse Terre, Guadaloupe ; Mémoires de l'Académie Royale de Médecine, t. 8, p. 100.

while in Great Britain only ninety-five per thousand of the strength are similarly affected. In Great Britain, also, they only occasion a mortality of about one in two thousand, while in the West Indies, the deaths are twenty-one per thousand, being a ratio of forty times as high as among the troops at home.

The last appearance of dysentery in London, was apparently owing to an insufficient diet, and occurred at the Penitentiary at Millbank shortly after its completion. This prison is built on a marsh below the level of the Thames at high water mark, the river being banked out by a narrow causeway. It is also surrounded by a moat with sufficient water to keep the ground immediately around, in a state of dampness, and, consequently, the site presents every condition favourable to the formation of a mild paludal poison. As long as the prisoners were allowed a full and ample diet, they appear to have resisted its action, and to have enjoyed good health. No sooner, however, was the quantity and quality of their dietary allowance lowered, than dysentery of a very fatal character and which resisted all medical treatment prevailed for several months, and at length it was found necessary to clear the establishment of its inmates altogether. It is remarkable that no similar disease has been observed to prevail in its immediate neighbourhood.

We have few facts to enable us to determine the proportions in which the different *ages*, or the different *sexes* suffer from dysentery. At Sologne, the river was turned in July, leaving a considerable portion of its bed bare, which was covered with mud two or three feet deep, the collection of many years. This mud was removed and scattered over the country, and five days after, intermittent fever appeared, followed by dysentery, and of seventy-four cases of dysentery, thirty-three were men, and forty-one women. Of the seventy-four attacked, fifty-three were above fifteen years of age.

The returns of the troops from the Mauritius, shew that the mortality from dysentery falls principally on soldiers advanced in life, who have been the longest resident in the island, and who are likely to have suffered from previous at-



tacks. The proportion during the last seven years was as follows :

Age.	18 to 24	25 to 33	33 to 40	40 to 50	Total of all ages.
Aggregate strength of seven years . . . . .	3892	5361	1215	300	10.768
Died of dysentery. . . . .	26	63	24	8	121
Ratio per 1000, mean strength. . . . .	6.7	11.8	19.7	26.6	11.2

*Infecting distance.*—The paludal poison, when it produces dysentery, is, probably, circumscribed within the same limits as when it causes paludal fever, and its range is also affected by the same circumstances.

*Susceptibility not exhausted.*—The human frame is, unhappily, liable to repeated attacks of dysentery as well as to other forms of paludal disease. Those who have had most experience in hot climates, know that chronic dysentery is one of the great sources of mortality in those countries, and however slight at its commencement, each succeeding attack assumes a more intense and unmanageable character, till, after several recoveries and relapses, the patient ultimately sinks under it. In the expedition to New Orleans in 1814, it was observed, that in those soldiers who had previously served in the Peninsula, and in other hot climates, and whose livers were affected, the dysentery was almost always fatal. It is generally supposed, also, that each year's residence, in paludal districts, only the more increases the susceptibility to the disease.

*Co-exists.*—Few facts have been collected to illustrate this law; but typhus fever and dysentery have often been observed to co-exist in Ireland. The co-existence, also, of paludal fevers with almost every other morbid poison, renders it probable, that, as no exemption from disease of any kind has been pointed out in persons labouring under dysentery, that this affection is also capable of co-existing with most of those caused by other morbid poisons.

“The type of fever,” says Sir James Macgrigor, “how-

“ ever, accompanying dysentery was very much modified by  
“ that of the prevailing epidemic. In the hospitals in the  
“ Alentajo and Estramadura in 1812, intermittent fever pre-  
“ vailed, or accompanied dysentery and remittent fever, when  
“ the army advanced so rapidly, and remained sometimes sta-  
“ tionary in the two Castiles, in July, August, and Septem-  
“ ber. While every case of dysentery which appeared in the  
“ battalions of the guards in 1812 and 1813 was accompanied  
“ by the typhus gravior, and very generally had a fatal termi-  
“ nation, as did many at Ciudad Roderigo, Celorico and Viseu  
“ where the same form of fever was prevalent.”

*Modes of absorption.*—There is every reason from analogy to believe when dysentery is produced, that the paludal poison is absorbed by the mucous membranes, and infects the blood in the same manner as when it causes paludal fevers.

*Period of Latency.*—The time which the poison lies latent in the system before it produces this form of disease is probable as variable as that which precedes the attack of paludal fever. It has been seen that a large army may be infected in a few hours, while from the many cases which occur on ship-board, and at long dates after the ship has left the land, the period of latency may be estimated from a few hours to many days, weeks, and even months.

*Pathology.*—The theory of this disease is, that the paludal poison in a less dose than that which produces the mildest form of paludal fever, is absorbed by the mucous membranes, and infects the blood, and after a given period of latency causes dysentery or inflammation of the mucous membrane of the colon. In a few cases, likewise, either from continuity, sympathy, or a specific action of the poison, the mucous membrane of the stomach, or of some portion of the small intestine becomes equally involved in the disease. The liver and the spleen are, also, occasionally the seat of inflammation and abscess, but whether from sympathy or a specific action of the poison, is not determined.

It is to be regretted that we possess no data to determine the relative frequency of these occasional attacks, but that of the stomach is, in this country, the most rare. It is pro-



bable, also, that hepatitis is a much more frequent accompaniment of dysentery in the East Indies than in Europe or America. The inflammation of the mucous membranes of the alimentary canal may assume every form and degree incident to their structure—as the diffuse, the serous, the adhesive, the purulent or the ulcerative, and it is not unfrequent to find most of these different degrees existing in different portions of the canal at the same time. These inflammations, also, may attack either the free or the adherent surface of the mucous membrane, or else its glandular structure and these different parts may be either conjointly or separately affected. The pathological phenomena, however, vary in some degree in proportion as the patient falls either in the acute or chronic stage of the disease.

When the patient falls in the acute stage of dysentery, or within the first few days of the attack, and while he is yet passing blood, mucus, or a loose watery lymph, or all of them but before pus has appeared in the stools, the mucous membrane of the colon is found to be diffusely inflamed in patches varying from a shilling, or the palm of the hand, till the entire surface of the colon is affected. The colour of the inflamed part is of a deep cherry or venous red, and in some instances so nearly approaching to black, as to appear sphacelated. This membrane is also thickened, and its cohesion often so impaired as to be almost gelatiniform. In the West Indies, according to Dr. Cornuel, when the patient falls in this stage, the mucous membrane of the colon often presents a vast surface of inflammation, of which the transverse portion is the seat of greatest intensity. In the midst of this destructive disease, portions of mucous membrane of a yellowish white, or mother of pearl colour, like the mortified cellular tissue forming the slough of a carbuncle, are seen half detached or only slightly adherent. The fibrous tissue is, also, in general greatly thickened, and the diameter of the tube contracted; but at the same time, the intestine loses its tenacity and consistency, and is readily broken down so as to favour a rupture of the coats of which there are many examples.

The glandular structure of the alimentary canal is not ne-

cessarily affected in dysentery, still it is more commonly diseased, and in such cases, the follicles are either enlarged and transparent, or else enlarged, hard and opaque, according to the degree of inflammation. The contents of the colon are found in this stage to be blood, mucus, and a loose watery lymph, together with a small portion of fœcal matter. Many early writers speak of having found scybalæ in large quantities, but modern observation has shown this circumstance to be extremely rare. The mesenteric glands are gorged, but seldom greatly enlarged in this stage, while the mesentery itself often presents many red points, evidently the result of inflammation.

The second stage is said to commence\* when pus appears in the stools, but it must be admitted there are cases in which the disease pursues a chronic course, and terminates fatally without any such appearance. In this country, suppuration rarely takes place without ulceration, but it is not improbable from the quantity of pus passed by stool, sometimes many ounces, being so much greater than is generally secreted by ulcers of a similar magnitude, that other than the ulcerated portions of the mucous membrane may take on the suppurative process. This view is supported by the observation of Dr. Cornuel, who states that in Guadaloupe he has examined cases in which no ulceration has been found, and yet pus in

\* In the Peninsular war, says Sir James Macgrigor, a great many bodies of the dysenteric were inspected, and a great uniformity was found in the morbid appearances. In those inspected under Mr. Guthrie, Mr. Hennon and Mr. Arthur at Elvas, Abrantes, Celorico, St. Andero and Bilboa, they found ulcuscula which had a healed appearance, being covered with a delicate extension of the villous coat, or a reparation of a new substance. Purulent collections formed in various parts of the canal. The liver in many of these cases was found hardened, of a dark complexion, enlarged, and with preternatural adhesions. In some cases it appeared smaller than usual, and in these the spleen was large and much diseased. They found the pancreas diseased not unfrequently and sometimes the gall bladder, or its ducts. The reports of most other gentlemen were similar to these. In a majority of cases it was found that the colon from the arch downwards and the rectum more especially, were throughout in an ulcerated sloughy state, the liver and spleen enlarged and verging to suppuration. One spleen weighed three pounds four ounces.—Med. Chir. Trans. vol. vi. p. 436.



large quantities was occasionally contained in the colon. This author, also, states, "that in the West Indies from the ileo-cæcal valve to the rectum, the whole mucous membrane of the colon often presents one vast ulcer of a cherry-red or reddish black, which looks like the advanced stage of osteo-sarcoma. He adds, likewise, that the intestine is contracted and greatly thickened, being in some parts almost an inch in thickness, and sometimes cartilaginous, and that the inflammation, although extensive and grave towards the ileo-cæcal valve is nevertheless of greatest intensity towards the sigmoid flexure.

In this country, the pathological character of the second stage is ulceration of the mucous membrane of the colon and very commonly also of its glandular structure. The ulcers are usually seated at the free surface of the membrane, and they usually first appear as a number of small points intensely red, which soften and ultimately ulcerate. The ulcers may be deep or superficial, and their edge may be sharp and defined, as if made by a punch or else broken down and almost diffluent. "In dysentery," says Chomel,\* "the mucous membrane often presents an appearance of erosion which is an illusion for if we gently pass the handle of the scalpel over it we detach a reticulated false membrane, and find the mucous membrane below it red and softened something like gooseberry jelly."

As the disease advances, the extent of ulceration is often quite astonishing, the whole of the mucous membrane from the cæcum to the rectum seems one universal ulcer or series of ulcers, of which a few are occasionally found cicatrized, while others, perhaps, have burrowed so deeply as to rupture the peritoneal coat. The whole intestine is also greatly thickened, contracted, and firmer than usual, while the deep violet colour of the acute stage still remains, or has given place to a dark grey colour caused by the deposition of a melanic matter into the substance of the membrane, and is the "*colour ardoisée*" of the French school. Mr. Thomas, however, contrary to most authors, says, "that the mucous membrane does not participate in this general thickening,

\* Dict. de Med. vol. xxi. p. 823.

“but that it is the connecting cellular tissue which is thickened and deceives us.”

The adherent surface of the mucous membrane is rarely inflamed in the acute stage of dysentery beyond that degree which impairs its cohesion. In the second stage, however, it is frequently the seat of a number of small abscesses which give to the intestine that tuberculated appearance described by Pringle. The mucous membrane covering these abscesses at length inflames, softens, points, and bursts, and the pus escaping, abscesses of considerable depth are formed.

The glandular structure is, also, often concomitantly affected, whether the inflammation be seated at the free or the adherent surface, and the follicles are found enlarged, ulcerated, and, indeed, in every state of inflammation to which they are at any time liable.

When the small intestines partake of the inflammation, the lower portion of the ileum is the part most commonly diseased, and the mucous membrane of the affected portion is either of a deep venous colour or else ardoisée, according to the length of the disease, and it may be ulcerated or thickened—indurated or softened. “In one case,” Dr. Cheyne says,\* “that he found an effusion of lymph, extending nearly over the whole jejunum of a bright yellow colour, easily detached, and exposing the surface beneath in a highly vascular state.”

When the stomach participates in the disease, it frequently presents very different appearances. In the cases examined by Dr. Cheyne, the mucous membrane was found more or less of a deep red or violet colour. The least violence destroyed its continuity, while the surface was not unfrequently rough and granulated.† More commonly, perhaps, the colour of the mucous membrane is natural, but on its surface, a number of ecchymoses or else small ulcers are seen with edges as sharp, clean, and perpendicular, as though made with a punching instrument.

The peritoneum unless perforation has taken place, is sel-

\* P. 32.

† P. 29.



dom either inflamed or thickened, but often presents many injected or ecchymosed points, which, when the intestine is opened, prove to be the base of some deep seated ulcer. If the disease has terminated in dropsy, the peritoneum is commonly white, opaque, and thickened, or else injected, and perhaps, granulated.

The mesenteric glands are stated by Dr. Cornuel to be rarely enlarged in the West Indies, though he mentions having seen one as big as a pigeon's egg. Mr. Thomas, however, asserts that in France he has observed them to be generally enlarged, red and softened, sometimes resembling a clot of half fluid blood. After the twentieth day, according to the same authority, their consistency is not so greatly diminished, but sometimes they are as black as charcoal. He has not found them, however, in a state of suppuration.

Sir James Macgrigor examined twenty-two bodies that had died of dysentery in the East Indies, and found the liver diseased in sixteen of them, and from this, and similar circumstances, many pathologists have inferred that the liver was in all cases primarily affected, the dysentery being merely an accident and caused by obstruction in the portal system. In the Peninsular war, however, the liver was often found free from even the most trifling appearance of disease, at other times, indeed, it was altered in colour but not changed in structure. Still occasionally its structure was diseased so that it was found either larger or smaller than usual, indurated or softened, and sometimes the seat of abscess, but all these cases were comparatively rare, and especially the latter. In Guadaloupe, also, Dr. Cornuel found all the abdominal organs healthy, except the intestinal canal. In London the affections of the liver seem rather to be a consequence, than the cause of dysentery, for it is not unusual for patients after a long and ineffectual struggle against the affection of the intestines, to be carried off by sudden inflammation or abscess of the liver. Mr. Twining also states that he has observed the same thing at Calcutta ; for it often happened that the bowel complaint was on the decline, and the number of the evacuations considerably decreased, when the attention was

called to the tumefaction of the liver, whence he concludes that the hepatic affection must be caused by the extensive disease of the great intestine.

The spleen and pancreas are sometimes found diseased, and Mr. Twining notices the former as one of the most fatal complications of dysentery in the East Indies. These viscera are found either enlarged and softened, or enlarged and indurated; the spleen being sometimes the seat of abscess. It seems probable, that the diseased states of the spleen must be owing to a specific action of the poison for there does not appear to be any necessary connection between that organ and the colon.

*Symptoms.*—Dysentery is divided by all authors into two stages. The first stage is that which precedes the appearance of pus in the stools. The second commences with the appearance of pus. The first stage is usually short, seldom exceeding ten days or a fortnight. The second stage may last from a few days to many months, and from their different duration these stages are sometimes termed the acute and chronic stages, the latter term being peculiarly appropriate to those forms in which the disease degenerates into a chronic diarrhæa, without any pus being seen in the stools. It is important to mark this division into stages as the chance of our being able to cure this generally intractable disease, turns upon our arresting it before pus appears in the stools, for after that period, few recover.

It is remarkable that a disease so often fatal should, in the first instance, cause but little general sympathy of the constitution, so that fever, when it is present, is always moderate. Dysentery is, therefore, essentially a colitis, and for the most part, all the symptoms are local. The attack, however, may in a few cases be sudden, and the disease ushered in by a smart rigor, followed by slight fever, but more commonly it is preceded by some diarrhæa or else a few bilious stools causing a burning sensation of the anus, and which may continue for some days.

The preliminary stage passed, the stools become, more numerous, often ten to twenty in the twenty-four hours, and according to Dr. Cornuel, sometimes in the West Indies,



amounting to two hundred in the same period, so that the patient is incessantly "sur le siege." The stools are passed in general with great effort, and consist of mucus, or a white glairy matter mixed with blood. By degrees the quantity of blood increases till at last a pure black blood of loose consistency, and having sometimes a peculiarly foetid gangrenous odour, is passed. This exertion is accompanied by much pain or tormina of the abdomen, by great tenesmus, and by greater efforts at defœcation, so that at length procidence of the rectum may take place and greatly add to the suffering of the patient. In the West Indies, according to Dr. Cornuel, portions of mucous membrane, varying from a few lines to a few inches, are often passed in this stage in a gangrenous state, and the abdomen becomes tense or meteorised.

Inflammation, when strictly limited to mucous membranes, is not necessarily accompanied by pain, so that the patient is occasionally destroyed by acute dysentery, without suffering any abdominal pain. Pain, however, is a symptom which frequently exists, sometimes slight and transient, and relieved by pressure; at others, severe and constant, and increased on pressure. Its more usual seat is the umbilicus, but occasionally above or below it, or else to the right or left of the mesial line. It often, also, extends down the thighs. The different complications, amount of pain and of purging, cause dysentery in different countries, and in different persons in the same country, to vary from little more than diarrhœa to the severest forms of cholic or even of cholera.

Dr. Cornuel describes the face, in the early stage, to be red, and the eye brilliant. There is no pain in the head, and the intellect is clear, but, nevertheless, the patient is sleepless, a prey to great anxiety, and though complaining much of weakness, is still able, without assistance, to reach the water closet. The pulse is accelerated and hard; the tongue natural, and the skin warm and moist; but the bladder sympathises with the state of the rectum, is irritable, and causes an incessant desire to pass urine, which is always scanty, high coloured, and sometimes suppressed.

Looking to the position of the patient, he almost inva-

riably lies on his back, as being most favourable to the contraction of the sphincter, and of the elevator ani. When, however, the pains are severe, he lies on his side, bowed forwards, and with his thighs strongly pressed against the abdomen.

This disease may terminate fatally in the first stage, or the patient may recover. In the former case, hiccough and vomiting come on, the features become pale and sharp, the pulse small and rapid, while the temperature of the body sinks. The intellect, however, is perfect, and the patient often deploring the fate which he foresees inevitably to await him, at length dies, after a short agony.

The patient, however, frequently recovers, and he does so, perhaps, more commonly in the first than in the second stage of dysentery. In this case, the skin continues warm and moist, the pulse becomes fuller and freer, the face assumes its natural expression, the flow of urine is re-established, and the patient is enabled to sleep. From this period, the prostration greatly diminishes, the stools become more natural in colour and more formed, and, at length, the healthy mucus which lubricates the intestine is secreted, and the patient is restored.

At the end of a few days, however, pus may be seen in the stools, when the second stage is formed, and the patient plunged into most imminent danger. The pus passed in some mild cases, is small in quantity, but more commonly amounts to several ounces in the twenty-four hours, and may be voided with or without blood,\* shreds of lymph, lumps of a sebacious substance, or with fœcal matters, the number of the stools continuing unabated. It is singular for what a length of time the patients seen in London will continue to possess an excellent embonpoint, appetite, freedom from pain, and from all constitutional affection, notwithstanding the long continued action of these powerfully exhausting causes. At length, however, the scene advances to its close, and the

\* In the East Indies, Mr. Twining observes that in all the cases of chronic dysentery that came under his observation, the stools were watery, or like a mixture of chalk and beer, and in a state of fermentation, and mixed with portions of undigested aliment.



stools become more frequent, the tenesmus more distressing, while the pain, perhaps, up to this period altogether wanting, becomes severe and constant, and occupies a large extent of the abdomen. The bladder, also, becomes more irritable than before, and the action of the stomach, often inverted, produces frequent vomiting, so that the patient, overwhelmed by all this variety of suffering, is broken down, strikingly emaciated, and often earnestly prays to be released from a life disgusting to himself, and entirely despaired of by others.

In the West Indies, indeed, Dr. Cornuel describes the patient in the last stage of this disease, as being more completely emaciated than in phthisis. The ribs being strongly marked, the abdominal walls pressing on the spine, and the whole face and figure, indeed, taking their form entirely from the osseous parts. At this point, the patient sometimes dies without further suffering, and almost without agony, "like a lamp deprived of oil." But it is not always thus that life is severed from the body; for often, about ten days before death, a burning sensation or constriction of the throat comes on, which hinders the patient from swallowing or from speaking, the buccal membrane, also, inflames, the mouth becomes apthous, and sometimes even the cheek is ulcerated.

In this country, the fatal symptoms more commonly are, the patient suffering from great pain in his abdomen, or the formation of an abscess of the liver. In those cases in which abscess of the liver forms subsequent to the dysentery, there is seldom much pain felt in that organ. On the contrary, it is of cold formation, and frequently the first indication of the disease is the patient falling into a typhoid state, in consequence of the pointing of the abscess, and from this he seldom recovers. In other cases, the peritoneum sympathises with the diseased state of the intestine, and the patient falls into dropsy. But the most fearful conclusion of this disorder, however, is when one or more ulcers burrow till the bowel ruptures, so that its contents escaping into the cavity of the abdomen, produce an uncontrollable and unmitigable peritonitis, and the patient falls from the most painful of all deaths.

The patient, however, may fortunately recover, and in this case, the stools become more formed, the pus disappears, the healthy mucus of the intestine is restored, the appetite returns, and the patient, at length, recovers his strength. It often happens, however, in hot climates, that the disease intermits, and the hope is fallacious; for sometimes the patient will pass twelve to fifteen hours without feeling any pain or having more than one stool; but the amendment is transient, the paroxysm returns, and with it the painful train of the previous symptoms.

*Diagnosis.*—It is difficult, perhaps impossible, in the first stage, to distinguish dysentery from diarrhæa; but the blood, the number of stools, and the little fœcal matter passed, will, in times when dysentery is endemic, allow the calm observer very closely to approximate to the true nature of the disease. When pus appears in the stools, unless some fistulous or other abscess has burst into the intestine, there can be no doubt of the nature of the affection.

*Prognosis.*—The prognosis depends much on the country in which the disease occurs, and the following table, compiled from the statistical and other reports, will give the true average of the mortality from dysentery in many of our most important colonies.

TABLE OF MORTALITY FROM DYSENTERY IN DIFFERENT COUNTRIES.

Stations.	ACUTE DYSENTERY.			CHRONIC DYSENTERY.		Deaths to admissions.
	Admitted.	Died.	Deaths to admissions.	Admitted	Died.	
Gibraltar .....	2594	49	1 in 53	59	15	1 in 4
Malta .....	1303	78	1 in 17	98	16	1 in 6
Ionian Islands .....	3461	116	1 in 30	307	68	1 in 4½
Nova Scotia. New Brunswick. (Acute and chronic not ascertained.)	244	18	1 in 13			
Upper and lower Canada						
Ditto .....	735	36	1 in 20½			
Windward and Leeward command .....	14.076	608	1 in 23	3.767	759	1 in 5
Jamaica command ...	4.473	114	1 in 40			
Madras army — Europeans .....	2.910	236	1 in 12	436	70	1 in 6
Natives .....	1.338	119	1 in 11			
In Guadaloupe .....	1.078	123	1 in 8½			



In general, the prognosis, therefore, in dysentery in hot climates is favourable in the acute stage, in the proportion of one to twenty or twenty-five, at least, when the patient can command the comforts of a hospital. On actual service, however, these chances are often much diminished, while the chronic form holds out only one chance of recovery in four or five cases, in whatever country the patient may be seized.

In the dysentery which reigned in Edinburgh in 1828, Dr. Christison considers the mortality in eighty cases to have been one in four. In the military hospitals also at Namur in 1831, out of one hundred and seven cases treated, twenty-six died, or nearly one in four.

In the Peninsula often after the tenesmus had been relieved, and the stools had become easy, yet the poor patient, at length, fell a martyr to his sufferings, their frequency being unabated. Sometimes the dysenteric symptoms having completely subsided, the patient fell into low fever and died in a few hours. In the hospitals at Alto de Chaô, Abrantes and Santarem, the change from intermittent to dysentery was very common, and this seemed to suspend the intermittent for a time, but no sooner were the dysenteric symptoms removed, than the intermittent returned. In some instances both diseases attacked the same patient at the same time, and when this was the case, the dysenteric symptoms were aggravated. When dysentery was combined with typhus the patient seldom survived.

*Treatment.*—As dysentery is essentially an inflammation of the mucous membrane of the colon terminating in suppuration, ulceration and sometimes rupture of the intestine, it is of much interest to determine whether bleeding, according to the laws of the phlegmasiæ is a curative means, or according to those of morbid poisons, will aggravate the disease. It is desirable, also, to ascertain the effects of quina and of calomel remedies, so powerful in controlling the primary as well as many secondary actions of the fevers equally caused by the same paludal poison.

Perhaps there is no question on which the profession are so generally agreed as on the inutility of large bleedings in dysentery. There are many authors who, with many limitations, recommend one general bleeding, but in almost every writer we find local bleeding the rule, and general bleeding the exception.

Cullen, who must have had considerable practice in dysentery in the West Indies, tells us in his "Practice of Physic."\* "At the beginning of the disease when the fever is in any way considerable, blood-letting in patients of tolerable vigour may be proper and necessary, and when the pulse is full and hard, with other symptoms of an inflammatory disposition, blood-letting ought to be repeated, *but* as the fever attending dysentery is often of the putrid kind, or does in the course of the disease soon become of that nature, blood-letting must be employed with great caution."

Dr. Ballinghall says,† "In the regiments in which I served, two circumstances contributed to restrain us in a free use of the lancet. The first was a due deference to the opinions of the older practitioners in India, which at the time of our arrival was almost universally against it; the second was the diminution of vigour in the constitution of Europeans, which a residence in India speedily produces," and he adds,‡ "our attention, therefore, in the first instance is to be directed to the diminution of this violent inflammation of the colon which will otherwise terminate in mortification and death, and for this I have to urge a vigorous use of topical applications, of which leeches, blistering, &c., constitute the chief." Mr. Annesley's evidence for general bleeding is equally negative.§ "In the great majority of cases, local bleedings are necessary, and in some, especially in recent visitors of the climate, they should be preceded by general blood-letting." The directions of Dr. Cornuel derived

\* Vol. ii. p. 69.

† P. 68.

‡ Diseases of India, p. 69.

§ Diseases of India, p. 355



from a large experience in Guadaloupe\* are “if the patient  
“ be recently from Europe, one general bleeding from twelve  
“ to sixteen ounces, and this to be very rarely repeated. If  
“ violent tenesmus be present, three or four leeches to the  
“ anus, or if violent colic, cupping or leeches in the course of  
“ the colon.”

If we turn to the practice in Europe, Sir James Macgrigor says, “in the Peninsular war, in well marked cases, sixteen  
“ ounces of blood were immediately taken from the arm, and  
“ though a few of the medical officers carried blood-letting to  
“ a much greater extent, the practice had so little to recom-  
“ mend it, that it was not generally imitated.” Mr. Amiel likewise says in the dysentery of Gibraltar in 1825, “general  
“ and local bleeding failed.” When dysentery reigned in the Penitentiary, Millbank, in 1823, bleeding, blistering, or fo-  
“ mentation relieved a pain increased on pressure, “*but*,” says Dr. Latham, “without removing any other symptom.”

In the dysentery of 1826 in the South of Ireland, “I must  
“ confess,” says Dr. M’Carthy, “my *opinion* was favourable  
“ to the early use of the lancet. My *experience*, however,  
“ has greatly altered my views on this subject. I am satisfied  
“ very few cases were benefitted by blood-letting, and that in  
“ several it did mischief, and that in all, it rendered the subse-  
“ quent debility considerable, and the convalescence tedious.” It seems proved, therefore, by most ample testimony that bleeding, to any extent, is not a safe remedial agent in the cure of dysentery, but on the contrary, often pernicious; and, consequently, in this respect, the disease appears to follow the laws of diseases produced by morbid poisons rather than of those resulting from simple phlegmasiæ.

As quina is unquestionably a specific remedy in the cure of the milder and uncomplicated forms of paludal fever, it might be presumed to have a most direct and beneficial influence in the cure of dysentery, but so singular are the laws of the paludal poison, that as a general rule, its exhibition in any

\* He states that he has treated 1078 cases.

form has proved injurious rather than sanatory. This medicine has been used in this disease by Cleghorn, by Dr. James Clarke, and still more recently by Dr. Ballinghall, but without such success as to warrant either its recommendation or adoption. It appears, also, to have been used by Mr. Follet in the autumnal dysentery which reigned in the French armies in 1810, but the loss was great, and consequently the remedy was unsuccessful.

The favourable and almost specific actions of mercury in many of the secondary actions of paludal fever make an investigation of the effects of this substance in the cure of dysentery, a matter of much interest, especially as it has been extensively used, and in many cases with unquestionable benefit. We must regret, however, that much difference of opinion exists as to the circumstances under which it ought to be exhibited. Some, for example, prescribe it in the acute stage, others restrict its use to the chronic stage. Some also think it ought to be pushed till the mouth is affected, others give it only small doses, while others again conceive that, however exhibited, it should be withdrawn as soon as relief from tormina is obtained. It would appear also to be a remedy of different value in different countries.

Dr. James Johnson,\* recommends its use in severe cases to ptyalism. "I have mentioned," he states, "in my own case  
"when despairing of a recovery, I took in one night two scrup-  
"ple doses of calomel, without experiencing any increase of  
"tormina or urgency to stool, but, on the contrary, with an  
"apparent alleviation of those distressing symptoms. Although  
"this circumstance did not make much impression on my  
"mind at the time, as I considered it merely accidental, yet  
"when some of my patients afterwards appeared in similar  
"situations, and I was in great anxiety about the event, I  
"ventured to have recourse to the same measures, and never,  
"in any one instance, with injurious effects, but very gene-  
"rally with an amelioration of the symptoms, and an acce-

\* Influence of tropical climates, p. 204.



“leration of the object in view, ptyalism.” Again ;\* he adds, “from much experience in this disease, I may with confidence assert that I scarcely remember to have lost a patient in primary attacks, when mercury and calomel was given freely, so as to open the bowels, and bring on ptyalism.” Ptyalism is, indeed, in Dr. Johnson’s opinion so essential to the successful issue of the case, that in presenting the reverse of this favourable picture, he proceeds, “those who have had most experience in hot climates, best know the melancholy fact that in every repetition of dysentery, and after every successive year of our residence between the tropics, we find the remedy has greater and greater difficulty in conquering the disease. In process of time as the intervals between the attacks become curtailed, we find it a very tedious process for the mouth to become affected with mercury, and what is still worse, the check thus given to the complaint is only temporary, for soon after the influence of our medicine wears off, our patient returns on our hands as bad as ever. At length, the system absolutely refuses all impregnation from mercury, and we have the mortification of seeing our patient waste away, and die for the want of the only remedy that could possibly arrest the hand of death—change of climate.”

Mr. Annesley equally recommends calomel should be given in scruple doses in the acute stage ; but, contrary to Dr. Johnson, warns us against carrying the remedy so far as to affect the mouth ; “for in that case, it generally lowers the powers of life too rapidly,” and, he adds,† “after the acute symptoms are removed, the calomel in the manner now recommended should be either altogether discontinued or given only occasionally, when its operation may be assisted by mild oleaginous aperients.”

It is singular, after such strong recommendation of mercury in the acute stage, that Dr. Ballinghall should oppose its use in that stage and as strongly recommend it in the

\* P. 208.

† Sketches of India, p. 418.

chronic forms of the disease. He says when his regiment landed in 1807, in Prince of Wales's Island,\* dysentery soon occurred in a very serious shape, and the exhibition of mercury was then a very general practice in the Island in all cases of flux, "and in the dysentery of natives, and of old residents in India, it might have been a very successful practice, but was far from being so among the description of men we landed there." Again, he adds, "after a large experience in this disease,† if in treating of the acute forms of flux, I have refrained from an indiscriminate, and as I conceive, unmerited recommendation of this powerful medicine, it is only in the hope of being able to urge its employment with double force in the form of disease now under consideration—to recommend an implicit reliance on it in the chronic forms of flux—to ascribe an almost unlimited power to it in this disease, and to express an opinion that it will seldom disappoint our most sanguine hopes." Such are the discrepancies between these very considerable Indian authorities; and to add to the difficulty, Mr. Walsh tells us that in the Rangoon expedition, "mercury only exasperated all the symptoms of dysentery."

Sir James Macgrigor seems to think that calomel is applicable only to the dysentery of particular countries, and that the dysentery of India and the dysentery of Europe are different diseases; the former being readily cured by calomel, nitric acid, etc., while in the dysentery which prevailed among the British troops in Egypt, calomel gave no relief, unless it acted as a purgative; and Dr. Frank observes that the large doses of calomel, given so generally by the English surgeons in India, proved dangerous to the French troops in Egypt. In the Peninsular war, we are told, mercury was found highly useful in dysentery complicated with liver complaints; and it was from its singular utility in this latter class of disease, that the practice became general of treating dysentery, in all its stages, by this remedy. In the early stages, however, and before repeated venesection, it aggravated the symptoms,

\* P. 76.

† P. 84.



and in the more advanced stages, particularly when there was either hectic with extensive erosion or ulceration of the intestine, it was invariably found to hasten the fatal termination.

In this country, Mr. Hooper tells us that salivation produced no beneficial effects in the dysentery which prevailed among the troops that returned from Corunna. In the dysentery of the Milbank Penitentiary, "latterly," says Dr. Latham, "calomel was administered in every case so as to affect the mouth," and very frequently fifteen grains were given at a dose. "On the next day, we sometimes found " the patient had passed an easier night, that the evacuations " had been somewhat less frequent, and the tormina and " tenesmus had somewhat moderated, but that since the " morning, the symptoms had become worse again, the pains " as severe as ever, and the evacuations frequent and quite " altered in their appearance. Under these circumstances, " fifteen grains of calomel and two of opium were given a " second time. Sometimes, the day after the first large dose " of calomel and opium, we found the patient exulting that " he had been cured as by a charm, that he had slept all " night and his pains were gone, and that he had had several " evacuations, of which the two or three last were almost " natural. With this sudden improvement, salivation had " either already arisen or was at hand. Under these circum- " stances, the use of mercury was either suspended, or small " doses of calomel and opium were given, until ptyalism " appeared, which was generally obvious at our next visit. " In some cases, which did not readily yield to the influence " of mercury in this form, and when the disease was un- " abated, inunction was finally employed, and with the " most favourable results." It might be imagined from this statement, that the success of mercury had been pre-eminent, but in the end, three other physicians were added to the establishment, solely for the purpose of contending against this endemic dysentery, and ultimately, the disease baffling all their efforts, the prisoners were obliged to be removed to the Ophthalmic Hospital, and to the hulks at Wool-

wich, when the few women who survived, were all pardoned, on account of the severe disease they had passed through.

In Ireland, the same discrepancy respecting the use of calomel exists. "That large doses of calomel were safe and effectual in this disease, is a fact I can verify," says Dr. M'Carthy,\* "from the experience of many hundred cases ; " and since I commenced its exhibition in this form, I can "faithfully declare I have rescued some of the most hopeless and alarming cases from death. I do not mean to say "that it is necessary to prescribe this active medicine in such "full doses in all cases of dysentery. It is worthy of remark, that in very few instances, did mercury produce "ptyalism. One observation must merit attention. As "soon as the liver assumes the healthy secretion, and the "bloody stools diminish, we must also give up the calomel. "If it be continued after this, we incur all the risk of sub- "jecting the system to a state of great debility and to all the "horrors of mercurial irritation—'sunt certi denique fines.' " On the contrary, Dr. Cheyne, in the third volume of the Dublin Hospital Reports,† says :—"The treatment by calomel, as I expected, calomel and ipecacuanha, the blue pill "and ipecacuanha, doses of five grains of calomel and half a "grain of opium, at stated intervals of four or six hours, large "doses of the same medicine, a scruple of calomel and two "grains of opium, all these methods often failed when the "disease was established, not only with me, but with some "of my colleagues."

It is plain, therefore, from the preceding data, that mercury is not, in any country, a specific remedy in the cure of dysentery, and although it must be admitted to be occasionally useful, yet the law which determines its applicability to any given case is not defined, and that nothing might be wanting to complicate the question, it is only necessary to repeat the experience of Dr. Cornuel, of Guadaloupe. This

\* Edinburgh Medical and Surgical Journal,

† P. 40.



physician states his practice to be ipecacuanhæ, gr. iv., calomel gr. iij., opii. gr. j. made into six pills, one to be taken every two hours. "These pills," he says, "cause no vomiting, but affect the mouth rapidly, and should be stopped as soon as that effect is produced. They are sometimes," he adds, "salutary, but this effect is not constant; for they often succeed in a given number of cases, and then, without any assignable cause, cease to be beneficial in others." It follows as a consequence, that neither quina nor calomel are antidotes to this form of paludal disease, and that there is no exclusive plan of treatment applicable to all cases.\* Admitting, therefore, the necessity of occasionally employing general and local bleeding, and also calomel in cases complicated with hepatic affection, we have beyond this only the general principles to guide us of allaying irritation, and of controlling, if possible, the diarrhæa; and the remedies employed for this purpose have been principally ipecacuanha, opium, astringents, and, occasionally, purgatives.

Ipecacuanha was formerly much in vogue in the treatment of dysentery, and especially in Brazil. The method adopted in that country was to infuse forty grains of ipecacuanha in four ounces of cold water, and the fluid parts being strained, were to be taken and repeated every three days. Dr. Cornuel says that his patients, when so treated, vomited after the first dose, were nauseated by the second, while the third seldom produced any inconvenience. The diarrhæa was, he says, often stopped, but it appears from the results, this remedy very constantly failed. Mr. Twining thinks

\* In my own practice in London, I do not remember to have found mercury beneficial in any form or quantity in the chronic forms of dysentery. In a recent case it was attempted to exhibit the hydrargyri nitrico-oxydi in the fractional dose of one twentieth of a grain three times a day. The patient for a time considered himself to have been cured as by a charm, but he unexpectedly passed a considerable quantity of blood, rapidly sunk and died. In this case there were not more than twenty ulcers in the colon.

that six grains of ipecacuanha, with four grains of extr. of gentian every night, may be strongly recommended for relieving tenesmus and irritation, for restoring a healthy state of the alvine evacuations, and in more remote stages of the disease, promoting the healing of intestinal ulcers. This gentleman, however, in the opinion of Mr. Martins, has probably overrated the importance of his favourite remedy, and also miscalculated the anti-emetic property of the gentian; for, he adds, this plan has not been followed by any of the other practitioners at the general hospital to which Mr. Twining was attached for several years.\* The opinions on the use of ipecacuanha are very various, but it is generally agreed that its best effects result in simple and uncomplicated dysentery only. My own experience in the severe chronic dysentery met with in London, is that ipecacuanha, when combined with opium, has the property of so far improving the evacuations, as to suppress the hæmorrhage and the secretion of pus, but beyond this point, it has no power, and the patient, something relieved, ultimately sinks.

The whole class of narcotic and sedative medicines have, of course, been tried for the purpose of relieving pain and checking diarrhæa, and in all countries, with a certainty of relieving the patient, but unhappily, except in slight cases, without curing the disease. Of these, opium, as the most powerful, has been given to a great amount, even in this country. Dr. Christison says he gave it in the dysentery that prevailed at Edinburgh in 1828, to the amount of twenty to twenty-four grains in the twenty-four hours, permanently checking hæmorrhage, but apparently not preventing ulceration. For he adds, “frequent thin, fœculent stools continued many days, sometimes many weeks, indicating, it is presumed, the existence of ulceration.”† It has seldom, however, been thought right to prescribe it in doses so large, and one to two grains every six or every four hours,

\* Medico Chir. Review, January 1841, p. 109.

† Edinburgh Medical and Surgical Journal.



is the quantity more usually exhibited. It is right, having thus spoken of the value of individual remedies, now to point out the modes of treatment recommended by Sir James Macgrigor to be generally adopted in the army, and acknowledged by him to be derived from Dr. Somers.

“ He commenced,” says Sir James Macgrigor,\* “ by copious venesection, and immediately afterwards gave pulv. ipecac. composit. gr. xij. every hour, which was repeated three times, with plenty of warm barley water, and profuse sweating was encouraged for six or eight hours. A pill of three grains of calomel and one of opium was administered every second night, and in the intervening day, 3ij of sulphate of magnesia, dissolved in a quart of light broth. The venesection was to be repeated while the state of the strength and pulse permit it, until the stools are free, or nearly free from blood, following up Dover’s powder as a sudorific.

“ In cases where the pains were excruciating, and attended with tenesmus, the warm bath gave instantaneous relief. This plan being steadily persevered in for a few days, the inflammatory diathesis of the intestinal canal, which had excited symptomatic fever throughout the general system, was found to relieve and make way for returning health. In this stage, gentle tonics, with light nourishing diet, cautiously exhibited, and at first given but in very moderate portions, were introduced with the happiest effect.

“ The disease was not unfrequently cut short by the above plan. If, however, the second stage advanced and the disease became chronic, a different mode of treatment was pursued, and not unsuccessfully, if the disease had not been of long duration, the intestinal canal much disorganised, or not complicated with other diseases.

“ The first indication in this stage was to relieve the tenesmus and procure easy stools; and with this view, ipecacuanha was given, sometimes with calomel, sometimes without it. The neutral salts were given, or oleum ricini, jalap

\* Med. Chir. Trans. vol. vii, p. 148.

“ and various other medicines of the same class. The second  
“ indication was to relieve the number of the stools, and to  
“ restore tone to the alimentary canal. With this view,  
“ Dover’s powder, pulv. cretæ compositum cum opio, astringents  
“ and demulcents with aromatics, were given occasionally,  
“ interspersing laxatives and obviating particular symptoms  
“ as they occurred. Lastly, an infusion of bitters was given  
“ to restore tone to the relaxed intestine.

“ It was when there appeared disease of the liver, or when  
“ there existed diseased action of the biliary system in dys-  
“ sentery, that mercury was found so highly useful, and it  
“ was from its singular utility in this combination of disease  
“ that the practice has become so general of treating it in all  
“ its stages by this remedy—a treatment which must in many  
“ cases be highly improper.

“ In cases where along with dysenteric symptoms we de-  
“ tect the obscure symptoms of chronic hepatitis; namely,  
“ dull pain in the region of the liver, in the right shoulder,  
“ tenderness on pressure, dull brown colour of the skin, or  
“ adnata, with uneasiness if the patient lies on any but the  
“ right side—in such cases, mercury never fails to cure, or  
“ at least relieve. In other dysenteric cases, likewise, with-  
“ out pain, but with uneasiness on the right side, or epigas-  
“ trium, and when pain in the right shoulder is complained  
“ of, the disease is successfully treated by mercury. There  
“ was, likewise, a chronic disease, where not even the most  
“ obscure hepatic disease could be detected, most frequently  
“ consequent to acute dysentery, where, without fever and  
“ with but few stools daily, diseased action was kept up,  
“ mercury introduced so as to affect the system gently and  
“ gradually, with a light nourishing diet, effected a cure.  
“ Further, in that combination of the disease, with obstruc-  
“ tion of the mesenteric glands, mercury appeared to be the  
“ only remedy that afforded relief.

“ These appeared to me to be the only cases of this dis-  
“ ease in which mercury is pre-eminently useful. In the  
“ early stage of the acute and unmixed disease, and before  
“ repeated venesection has been performed, it will aggravate



“ the symptoms. In the more advanced stage of the disease,  
“ particularly when there is either hectic fever, with extensive  
“ erosion or ulceration of the intestine, it was invariably  
“ found to hurry on to a fatal termination.

“ In most of the cases where the use of mercury was  
“ indicated, it was generally deemed advisable to introduce it  
“ gently and gradually into the system. Sometimes there  
“ existed irritability of the stomach, and there was always  
“ great debility ; great circumspection, therefore, was neces-  
“ sary in the introduction of a remedy, which of itself is so  
“ apt to produce debility, at the same time it removes the  
“ urgent symptoms of the disease. It was reported to me  
“ that this disease was apt to recur whenever the system  
“ ceased to be affected by mercury, and that relapse was  
“ more apt to recur after its use. However this may be, the  
“ cases are very numerous where no other remedies gave the  
“ patient a chance of life.

“ Ipecacuanha, opium and other articles were frequently  
“ given with calomel in small and frequently repeated doses ;  
“ and gentlemen gave the blue pill till the mouth was affected,  
“ but the general opinion was that friction of the abdomen  
“ with mercurial ointment, gave the least irritation, and, at  
“ the same time, produced less debility. During this prac-  
“ tice, gentle purging by means of oleum ricini, or the neutral  
“ salts, was continued, and the combination of an opiate with  
“ the diaphoretic was advantageously given at night, or  
“ oftener, to procure sleep and allay irritation.

“ The combination of nitric acid with opium was tried, and  
“ it was said to have been of use in a few cases of long con-  
“ tinued dysentery, complicated with diseased viscera, where  
“ frequent stools, unaccompanied by pain and tension of the  
“ abdomen, were the most urgent symptoms.

“ Mr. Woolrich, in the hospitals at Celorico and Castello  
“ Branco, found great benefit from a mixture of balsam  
“ copaiba in gum arabic, with an infusion of calumba, using,  
“ occasionally, gentle mercurial friction, flannel bandages  
“ and a milk diet. When frequent stools, without pain,  
“ were the most troublesome symptoms, the vegetable

“ astringents, as hæmatoxylum, catechu and kino, given in  
“ large quantities of mucilage, and assisted by opium, gave  
“ much relief.

“ Under the same circumstances, I have frequently seen  
“ enemata afford signal relief, as I have also witnessed where  
“ there was erosion or ulceration of the intestine. I believe  
“ there exists a disease, often the consequence of dysentery,  
“ where with much debility, there only remains abrasion  
“ or incipient ulceration of the intestine; such disease I  
“ have always considered as local, and within the reach of  
“ topical applications. With this view of it, I have been  
“ for many years in the habit of throwing up a variety of  
“ substances, as enemata, for dissection shows that ulcera-  
“ tion is almost always in the great gut, and within the  
“ reach of external applications. I have, accordingly, used  
“ astringents, emollients, opiates and sedatives, according to  
“ circumstances, but I have often afforded signal relief by a  
“ tolerably strong solution of superacetas plumbi. Some  
“ gentlemen used an infusion of ipecacuanha, some the  
“ aqueous solution of opium, and some starch, rice-water,  
“ or milk.

“ It is, however, sometimes an objection to enemata of  
“ every description, that the rectum being irritable or in-  
“ flamed, a pipe cannot be introduced without adding to the  
“ existing inflammation. In such cases, the introduction of  
“ a grain or two of opium into the rectum, would frequently  
“ allay pain, and in some cases, tenesmus, when every thing  
“ else had proved ineffectual.

“ In the combination of the disease with visceral affection,  
“ Dr. Irwin met it successfully, in several cases, with the  
“ conium maculatum, and in some cases, by combining this  
“ medicine with calomel.

“ Among the sequelæ of dysentery, one of the most fre-  
“ quent is the tumid abdomen, which usually proceeds from  
“ these causes, first an extrication of air into the intestinal  
“ canal; secondly, enlargement of one or more of the ab-  
“ dominal viscera, most frequently the spleen and liver; and  
“ thirdly, effusion into the cavity. The whole of those were



“not unfrequently combined, as the dissection reports forwarded to me prove most amply.”

Such is a statement of the practice pursued in dysentery during the Peninsular War, and on a scale whose magnitude has seldom been surpassed even in modern times. From many favourable expressions, it might be supposed that the treatment of this frightful disease had been satisfactory and even successful; but if we look to the returns, we shall see reason to lament that the zeal and intelligence of our medical officers was not crowned with those happy results which they ardently laboured for and desired. The facts, however, of the case, as related by Sir James Macgrigor, are as follows :

Admitted into regimental hospitals labouring under dysentery.		Died in all the hospitals, regimental and general, of dysentery.
In 1812 . . .	3,241	2,340
1813 . . .	3,420	1,629
1814 to June .	865	748
	7,526	4,717

Or the deaths were to the recoveries as two to three nearly.

It is said that 7,526\* was by no means the whole number of cases of dysentery that appeared in the army, the greater part, and those which were the severest cases, being treated at the general hospitals. If, however, we double the number, the mortality will still be one in three; and when we consider the amount of those sent home to linger a few months and then to die, there seems little reason to doubt the propriety of the appellation which has been given to this disease, “the scourge of armies,” or to alter the proportion of deaths to recoveries as first deduced.

In London it is rare to meet with persons suffering from the acute stage of dysenteria palustris. The cases are

\* “It seems difficult to understand how this return can be greatly erroneous, for it was early arranged that every corps in the army established its own hospital, sending only to the rear, to the general hospitals, severe cases of disease, *and then only on particular occasions.*”—Sir James Macgrigor on diseases of the army, Med. Chir. Trans. vol. vi, p. 474.

generally seamen from tropical countries, who have long laboured under the disease in its chronic form, and are far advanced in the second stage; and, perhaps, there is no class of disease that presents so few chances of successful treatment. A small proportion, indeed, recover, still the proportion is but small.

In general, the dysenteric patient is admitted at too late a period of the disease to admit of active depletion; for the intestine being in a state of ulceration, it is difficult to see what good could result from it. Practically speaking, the application of leeches sometimes relieves the tormina, but they weaken the powers of the already debilitated constitution, and, perhaps, hasten the fatal conclusion. On the continent, the neutral salts and mild purgative medicines are highly spoken of, and they are probably useful when constipation, as it sometimes does, takes place in the small intestine; but beyond this, as they have no specific power, their action must tend to irritate the diseased part, and, consequently, to aggravate the malady. Of all the purgative medicines, two ounces of an infusion of ipecacuanha, (3i to lb.ʒ of boiling water,) combined with five to ten minims of the Ræ opii, and exhibited every six or every eight hours, appears to be the best; but it has been already stated the disease although mitigated, is seldom cured. Mercury, also, in whatever dose or form exhibited, has not appeared to take up the disease, or only temporarily to benefit the patient, while quina has aggravated all the symptoms. Vegetable tonics containing tannin, as kino, hæmotoxylum, or catechu, however, prepared or combined, give temporary relief, but are ultimately inefficient. The mineral acids are, also, seldom of sufficient power to restore the patient to health. Among the mineral astringents, the sulphate of copper has been much spoken of, but during the Walcheren expedition, when it was prescribed for some supposed virtue in the cure of intermittent fever, its use was abandoned, on account of the severe dysentery it was supposed to produce. It has the property, unquestionably, when combined with opium, of checking the diarrhæa for a few hours or a few



days, but at the end of that time, the diarrhæa has returned with redoubled violence, and the patient has sometimes died while yet taking it, while none have recovered. The balsams and gums of every description, have, in like manner, afforded only a transient relief. Of the remedies less known and used, it has appeared to me that salicine is of the most promise. The dose of this medicine is five grains, every six hours, or ten grains three times a-day, and it has the property of giving tone to the intestine, and often of curing the milder forms of dysentery or diarrhæa, after opiates and astringents have failed.

The disease being in all cases seated within reach of injections, demi-enemata, consisting of forty to sixty drops of Ræ opii in barley-water, or in a solution of gum arabic or starch has often afforded much present ease, both in this country and in the Indies, during the first stage of dysentery. In the more advanced stages, however, they are often not retained, or the pain caused by the introduction of the glyster pipe quickly induces the patient to abandon the use of them. It has been attempted to influence the disease of the colon by injecting weak solutions of sulphate of zinc, of the nitrate of silver, or the black wash, and to bring the medicine thus in immediate contact with the ulcerated parts, but unfortunately, altogether without success. An enemata, however, composed of a drachm of the sulphate of quina, has frequently afforded considerable ease to the patient, but without ultimately altering the fatal course of the disease.

Among the adjuvantia, the warm-bath, fomentations, and mustard cataplasms have been found of use in the first stages, but when the disease is confirmed, they are hardly palliatives. Flannel bandages and opiate plaisters have, likewise, been much used, but it is evident they act beneficially only in proportion to the warmth and support they may give.

*Preventive and dietetic treatment.*—In the early stages, the patient should be strictly limited to a milk or fish diet. In the more advanced stages, the appetite becomes capricious; and as the indication appears to be to support the patient, an animal diet does not appear prohibited, but he is seldom benefited by the indulgence. He often passes from one diet

to another; but the greater number of recoveries have occurred in those persons who have had courage to persevere in milk, puddings, and strictly farinaceous matters. A small quantity of wine or brandy is occasionally necessary.

As to preventative treatment, good clothing, a dry, warm atmosphere, and in all cases a change from the malaria districts are essential to the recovery of the patients. "There was no place," says Sir James Macgrigor, "in which more dysentery was seen than in Abrantes, in November, 1812. Dr. Somers informs me that since the setting in of the cold and wet weather, cases of dysentery of long standing were rapidly swept off in a few hours. He says that men, who, to all external appearance, and judging from the power of the circulation, were as well as for many preceding days, have suddenly, and, therefore, unexpectedly to the practitioner, sunk into dissolution in the course of an hour. This event occurred in numerous instances, notwithstanding every possible alleviation that could be derived from flannel clothing, and warm and comfortable bedding, which had seasonably been provided in the hospitals."

The question of the contagious or non-contagious treatment of dysentery, necessarily enters into the consideration of the preventative treatment of dysentery, and much difference of opinion has prevailed on this subject. The celebrated name of Cullen stands at the head of the contagionists. And he contends,\* that the disease is always contagious. Many authorities, however, who have had as many opportunities of studying this disease as Cullen, are decidedly of opinion that it is not contagious. Dr. Ballinghall, for example, affirms, "with regard to its contagious nature, it may be sufficient to observe that among some thousand cases which I have seen and treated, no one circumstance has occurred, tending to excite a suspicion of its being propagated by contagion." It is also certain, that in the London Hospitals, although the stools of dysenteric patients are frequently kept for some hours for inspection, yet no instance of the disease spreading by contagion has been

\* Practice of Physic, vol. ii, p. 55.



observed. Dr. Cheyne mentions, on the authority of Dr. M. Barry, the following fact, as an *experimentum crucis*. In the year 1797-8-9, dysentery prevailed in the Caithness Fencibles to some extent; and the surgeon, anxious to determine its infectious nature, caused the same glyster pipe to be used without cleansing, both for those labouring under dysentery, and for those who were free from that disease, yet the latter were not infected. In the expedition to New Orleans, although every boat's crew was sure to bring a reinforcement to the sick list, dysentery did not spread from man to man, but was confined to that portion whose duty led them on shore, or were employed in the boats in the river Apalachicola.

## CHOLERA INDICA.

The disease produced by the poison of cholera indica, may be divided into two stages. The first is marked by the most perfect and entire collapse (the brain being unaffected) known in medicine, and is most generally accompanied by vomiting and purging of a peculiar fluid like rice-water, and by the extremities becoming blue. In Europe, a second stage has generally, but not necessarily, succeeded to these symptoms, marked by all the phenomena incident to typhus fever. The duration of this disease is from a few minutes to eight or more days.





## OF THE POISON OF CHOLERA INDICA.

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THE formidable disease to which this poison gives rise, is remarkable for its sudden and great eruption in Bengal in the year 1817, and for its fearful spread, not only over the whole of the Peninsula of India, but also over the greater part of the habitable globe. It certainly was not known on the continents of Europe or of America prior to this epoch, and many old medical and civil residents in India had never seen the disease, so that by many persons it was considered to be of “secondary formation.” There seems good reason, however, to believe that cholera indica must have occasionally occurred sporadically, and, also, perhaps, endemically in India as far back as the annals of that country extend. The Bramins of India, for example, are possessed of certain medical writings, which they attribute to Dhawantari, a mythological personage corresponding to the Æsculapius of the Greeks, and in these writings supposed to be of great antiquity, there is the following poetical description of a disease which they affirm to be cholera indica, and which, making allowance for the general looseness of the descriptions of early times, certainly has many of its characteristic features. “Chilliness, like the  
“ coldness of the moon over the whole body—cough—diffi-  
“ culty of breathing—hiccough—pains all over the body—  
“ vomiting—thirst—fainting—great looseness of the bowels  
“ and trembling of the limbs.”

From the time to which the braminical records extend, till the Dutch formed their settlements in India, we have no further account of cholera. Shortly, however, after that period, or in 1629, Bontius, who practised in Batavia, pub-



lished an account of the diseases in India, in which he makes mention of cholera morbus, but attributes it “to the powerful operation of diseased bile.” One hundred and fifty years again elapse without any further information respecting the diseases of India, so that Mr. Curtis states that in 1782, the best general information on that subject was to be found in two *private letters* written in 1774 by Dr. Paisly, copies of which were in the hands of most of the older surgeons of the fleet cruising off Madras, under the command of Sir Edward Hughes. In one of these letters mention is made of cholera morbus or “*mort de chien*,”\* the general characteristic of which is “a hot bilious matter,” “an æruginous bile,” irritating to the stomach and intestines, “and copiously discharged by the mouth and anus.” This *characteristic* description both of Bontius and of Dr. Paisly is so much at variance with the phenomena of the cholera indica of the present day, in which no bile whatever is discharged either from the “mouth or anus,” that it would be difficult to conceive any identity between the ancient and modern forms of the disease. Mr. Curtis, however, seems satisfied, that the disease described by these parties is the cholera he witnessed in 1782, and thinks the letter referred to only “written in much haste,” and was enough “to show “of how great value a more finished sketch from the same “hand would have been.”

The preceding evidence would not have proved that cholera indica had existed in the East Indies prior to the general epidemic of 1817. The following admirable description, however, of the spasmodic cholera—the cramp or *mort de chien*—from the pen of Mr. Curtis as he witnessed it at Ceylon and Madras in the years 1782-3, leave no doubt of the prevalence of this disease at that period in India. “In all of them, the disease began with a water

\* The term *mort de chien* is supposed by Dr. Craigie, to be a corruption of *Mordechim* or *Mordixim*, a term used by the Moslems and Portuguese in India, and derived by them from a Persian word signifying bowel—death. *Practice of Physic*, vol. ii. Art. cholera.

“purging, and this always came on some time in the night  
“or early towards morning.” In a short time, “the spasms  
“began to affect the muscles of the thighs, abdomen and  
“thorax,” and, lastly, “they passed to those of the arms,  
“hands, and fingers.” As the disease proceeded, “the  
“eyes became sunk, hollow, and surrounded by a *livid*  
“circle. The pulse became more feeble, and sometimes sank  
“so much as *not to be felt* at the wrist two or three hours  
“after the spasms came on.” The hands now begin to put  
on a striking and peculiar appearance, for “the nails were  
“bent inwards, the skin of the palms became white,  
“bleached, and wrinkled up into folds as if long soaked in  
“cold water.” The body is now described as bathed in a  
profuse cold sweat, while the purging continued frequent, and  
exhibited nothing “but a thin watery matter or *mucus*.” In  
many, the stomach became at last so irritable that nothing  
could be got to rest upon it, “but every thing that was  
“drunk was spouted up immediately without straining or  
“retching, while the countenance and extremities became  
“*livid*.” In fine, the whole powers of life fell under such  
great and speedy collapse as soon to be beyond the power of  
recovery, the patients often continuing in possession of their  
faculties so as “to talk sensibly to their messmates to the  
“last moment of their life, even when the whole body had  
“become perfectly cold, and all pulsation at the heart had  
“ceased for a long time to be distinguishable.”\* And if we  
add to this description one trait from Mr. Girdlestone’s work,  
that the breath was “seen and felt issuing in a cold stream  
“at a considerable distance”—the great and characteristic  
features of this disease are most faithfully portrayed.

The perfect identity of these symptoms with those of the  
cholera indica, as observed in this country in 1831, will be  
immediately recognized by every body conversant with the  
disease, and the work which contains them being published  
in 1810, or seven years before the grand epidemic in Bengal,  
no question can exist of this disease having existed on the

\* Curtis on the Diseases of India, p. 48 to 53.



eastern coast of Ceylon and at Madras, as early as 1782. This circumstance is rendered still more probable by Mr. Girdlestone, although his description is most imperfect, having witnessed a disease which must have been the cholera, also, at Madras in the same year; for he states that “Spasms  
“ were the first diseases which appeared among the troops  
“ who arrived at Madras in October 1782, under the com-  
“ mand of Major-general Sir John Burgoyne. More than  
“ fifty of these fresh men were killed by them within the  
“ three first days after they were landed in the country, and  
“ in less than a month from that time, upwards of one thou-  
“ sand had suffered from attacks of these complaints. Some,” he adds, “died in the first hour of the attack, others lived a  
“ day or two with remission, when they died.”

This establishment of the existence of the disease by Mr. Curtis and Mr. Girdlestone in 1782, renders it probable that many sudden and severe endemic attacks both of the troops and of the inhabitants of India, must have been cholera. Thus a disease is said to have attacked a body of 5000 troops at Ganjam in 1781, “with such incredible fury that men in  
“ perfect health dropped down by dozens, and even those less  
“ severely affected, were generally dead or past recovery in less  
“ than an hour. Besides those who died, above five hundred  
“ were admitted into the hospital that day. On the two fol-  
“ lowing days the disease continued unabated, and more than  
“ one half the army was then ill.” Now there is no disease but cholera with which we are acquainted, whose action is so rapid and fatal, and which attacks large bodies of men. A similar disease appears to have broken out among the pilgrims at Hurdwar in 1783, and to have swept off 20,000 of those assembled to worship at that celebrated shrine. In the Madras reports, also,\* it is stated that a disease, which there can be little doubt was the modern cholera, prevailed to a great extent in a corps on its march southward from Jaulna in 1814. “Ninety-nine cases having occurred in sepoy alone in a fortnight, of which fourteen were fatal. These,

\* P. 234.

and similar instances, therefore, seem to prove that cholera indica has prevailed sporadically or endemically in various parts of India prior to 1817, but not to any great extent. In the autumn of that year, however, it appeared in Bengal, with a new and peculiar character, being not only epidemic over all India, but after having destroyed a considerable portion of the population of that country, extended its baleful influence east and west, till it embraced nearly the whole of the habitable world. At present it has subsided in countries to which it is not native, but still continues its ravages over the whole of the immense territories of India under the authority and influence of the British government.

*Remote cause.*—The remote cause of this disease is unquestionably a poison; for at no former period has a person in good health in this country been known to become in a few minutes shrivelled up—his whole body to be of an icy coldness—his face and extremities to turn purple or blue, and with or without vomiting or purging of a peculiar fluid to die in a few hours. Neither is it explicable on any other hypothesis than of a poison, that this disease should spread over countries, which in respect to climate, soil, geological formation, and also to the moral and physical habits of the population, are the most opposite to those where it first originated. Assuming, therefore, that cholera indica is produced by the action of a poison, whence does it originate, and how is it generated?

It was formerly supposed that cholera was entirely owing to great changes of temperature—to exposure to the damp, cold, night air or to the land winds. The general spread of this affection, however, over every quarter of the globe, and at all seasons of the year, will no longer allow that view to be entertained, and we are compelled to choose between the hypothesis, that it originates in a poison having a paludal origin and spreading by contagion, or that it is a poison existing like those of influenza, scarlet fever, measles, or hooping-cough, in the atmosphere, and generated by some telluric or other occasional agency, and brought into action according to laws with which we are at present unacquainted.



The hypothesis of the poison having a paludal origin, receives much support from the country in which the disease first appeared, being annually overflowed to a great extent; for the immense river formed by the junction of the Ganges and Burrampooter, bursts its boundaries in the rainy season, and inundates the country to a great extent. This is caused by the ground springing a little as it approaches the coast, which prevents the flood from at once rushing to the ocean, and it, therefore, disembogues itself slowly through a multiplicity of channels that intersect the great Indian Delta or Suderband in every possible direction. This check keeps the plains of Bengal overflowed from the latter end of July to the middle of October, during which period, says Dr. Johnson,\* “noted cities, populous villages, exalted mosques, “and stupendous pagodas are seen above the level of this “temporary ocean surrounded by innumerable boats, now “the habitation of domestic animals. At this time vessels “even of one hundred tons are beheld traversing the coun- “try in various routes, wafted by a breeze which seldom “shifts more than a point or two from the south. The “depth of water, during the inundation, varies from ten to “thirty feet, according to the undulations of the ground. The “original course of the rivers is now only known by their “currents, which may have a velocity of four miles an hour “upon an average, while the great body of the water spread “over the plain, moves at the rate of half a mile in the same “space of time.”

The Suderbands, forming the delta of this river, when the cholera first broke out, is described as being, in most places, rather above the level of high water, and becoming, during the rainy season, an immense woody or jungly marsh, neither “perfectly overflowed, nor yet quite dry;” in a word, well supplied with animal and vegetable matter in every state of decomposition, and combining all the other circumstances for giving miasmata their fullest influence over the human body, or heat, moisture, calm, &c. as any spot of equal extent on the surface of the globe.

\* Influence of climate.

As cholera first broke out in the heats of August, 1817, when the inundation of the Ganges, while it scatters fertility over the vallies and plains, sows also with a liberal hand the seeds of death ; it might be supposed, that as the disease originated in this low country, the poison must be a product of vegetable decomposition, the peculiar malaria being generated by some unusual states of the atmosphere. The overflowing of the Ganges, however, is annual, and, consequently, not unusual ; and although it must be admitted that the quantity of rain in that year was in excess, so that the whole country round Jessore “was one sheet of water,” yet a great abundance of that element has been considered in all countries the harbinger of health, withdrawing all putrescent matters from the action of the atmosphere. A reference also to the meteorological tables of Bengal shews, that the mean altitudes of the barometer and of the thermometer did not sensibly differ in those years, in which cholera so destructively raged in Hindostan, and in those in which that country was healthy ; for the barometrical mean of five years, from 1815 to 1820, corresponds exactly with the mean of the five preceding, or 29.86 inches, while the thermometrical mean for the same period varies only one degree and a quarter, a variation too trifling to account for the generation of this fatal poison. The peculiar circumstances of the season, consequently, will not explain the origin of this poison, especially as the disease has continued annually to prevail since its late eruption under every variety of season. It seems certain, likewise, that the poison of cholera does not follow the ordinary laws of paludal poison, in as much as the disease has prevailed in districts far remote from every source of marsh effluvia, spreading to countries of an entirely different formation, and raging in seasons when paludal diseases cease to exist. The circumstance of the disease thus spreading into every variety of country, and at all seasons, has caused it to be imagined that the poison might nevertheless be generated in paludal districts, and spread by contagion. But as cholera continues to prevail in India, and with great violence, yet has shown no similar disposition to



spread, the *prima facie* evidence is entirely against such an hypothesis.

The impossibility of connecting this poison with vegetable decomposition has led to the supposition, that it must be of inorganic, and, perhaps, of terrestrial origin, bursting from the earth like the choke-damp; but according to laws and conditions entirely unknown, and so subtle, that no chemistry has yet been able to examine or to exhibit its elements. This hypothesis has been extensively entertained, and is probably the true one—for if we suppose it to be generated, below the crust of the earth, and consequently beyond the influence of the atmosphere, it is easy to understand why its course is entirely independant of the seasons. Again, if we suppose it to have in any degree a central origin, this circumstance will readily explain why the miasm percolating with different facilities the different superincumbent strata, may burst forth at distant and remote places, forming new centres or foci of the disease—although its general course may be uniform. We can readily understand also on this hypothesis, why it may affect particular lines of country, as the banks of rivers, in preference to others, and it likewise explains the occasional reappearance as well as the suddenly declining of the disease in particular districts; for such, at least, is the law of all volcanic eruptions. Some physicians have imagined, from the streams of the disease having in some instances diverged at right angles to each other, or proceeding east or west, have trended to the north or to the south, that the poison, if not the electrical or magnetic fluids themselves, must be extricated by their agency. This, perhaps, may be the case; but cholera has been observed to rage in this country, and in India, under every different electrical condition of the atmosphere, or when it has been in a state of equilibrium, and when it has been most disturbed.

Other philosophers dissatisfied with the preceding theories, and observing that the disease was often propagated in a direction contrary to the wind, have imagined that the poison proceeded from planetary influences, and that, like the radiant matter of light and heat, it traversed infinite space, reaching

the earth unimpeded and unaffected by atmospheric currents. Others again have sought for it in the hypothesis of insect life, in the existence of living beings minute beyond the reach of vision, even when armed by its most powerful instruments. These animated molecules they have endowed with a boundless power of procreation, so that in countless numbers they spread over large portions of space with an erratic and ambiguous flight, representing the tardy, broken, and irregular course of cholera. It would be tedious to enumerate the multitude of hypothesis which have been invented to account for the remote cause of this poison, since all have been found, even on a slight examination, to be most unsatisfactory, or else wanting in strict demonstration. It is better, therefore, at once to admit, that the remote cause of this disease is entirely unknown, that the pestilence "walketh in darkness," and contenting ourselves with attempting to determine the laws of the poison, leave it to happier periods of medical science to ascertain its essence and its source.

The facts relating to the history and habits of this poison, independantly of its actions on the human body, are extremely interesting. Its sporadic and epidemic character are circumstances extremely remarkable. It spread also from kingdom to kingdom : not uniformly, but sometimes advancing and then receding, like the wave receding from the shore, till again hurried on by the advancing tide. This irregularity of advance has been observed not only with respect to many large and independant empires, but also in its attacks on minor portions of country, for it has sometimes passed over large districts, and, then suddenly returning, has almost depopulated the spot which had so lately congratulated itself on its escape. Oftentimes it acts intermittingly, bursting out at certain distant points, which appear to be centres from which the disease has radiated to the surrounding districts. And again, judging from the limited extent of the disease, the stream has often appeared to flow in narrow continuous lines. Its progress, also, has not been affected by season, nor regulated by temperature ; for it was at its height, or was



commencing, in one district, while it was declining in another. It has, like most epidemic diseases, its commencement, its acme, and its decline, and the mortality has followed the usual law in such cases, being proportionably greatest at the onset, and gradually decreasing towards the termination. It has indured a certain time, seldom more than a few weeks in any degree of intensity, in the great centres of attack; and has died away in all countries to which it is not native within the space of about three years. In the midst of all the apparent irregularities of its progress, its action on the human body, if not absolutely definite, has been uniform, and governed according to certain general laws. It will be necessary shortly to illustrate each of these leading points; and the history of its epidemic spread cannot be read without interest.

In the month of August, in the year 1817, after a rainy season of unusual length, so that the low country of Bengal was almost covered with water, a most malignant cholera broke out at Jessore, a dirty crowded town surrounded by jungle, and the capital of the Suderbands, a name given to a number of low marshy islands comprised within the delta of the Ganges. It was in this town, situated about one hundred miles north east of Calcutta, that the cholera raged with such severity, that in a few weeks upwards of 10,000 persons had died, or more than one-sixth of the whole number of inhabitants. The consternation produced by this sudden and unexpected irruption was so great, that the civil courts were shut up, all business was suspended, and the inhabitants fled in crowds to the country as the only means of escaping impending death. Towards the end of the month it had broke out at Calcutta, brought, as was supposed, from Jessore, and here its ravages were almost as extensive, for two hundred persons died daily in this city. The disease now radiated in every direction, till it embraced the whole of the province of Bengal, probably favoured by similarity of soil, of atmosphere, and of the habits of the people. This, however, was but the beginning of the pestilence, since from Calcutta two principle streams, as they have been termed, penetrated the other provinces of India; the one flowing

westward till it reached the grand army, distant four hundred miles in the Bundelcund country ; the other southward, or along the Coromandel coast towards Madras.

The grand army had been assembled on the banks of the Sinde, in expectation of a war with the Pindarees—a lawless banditti, who, with the connivance and assistance of the Mahratta powers, had ravaged a great portion of central India. The communication between the grand army and Calcutta, and the passage of stores, ammunition and baggage occasioned an unusual bustle along the whole line. Early in November, many intermediate towns being infected, but many also being as yet spared, the cholera against the periodical monsoon, reached the camp consisting of 10,000 fighting men, and 80,000 camp followers, under the immediate command of the Marquis of Hastings. At first its victims were few and confined to the lower class of camp followers, but by the 14th of November the disease had become so extensive, and the mortality so great, that “the whole camp wore the appearance of a hospital, and the noise and bustle inseparable to a body of armed men was changed into solicitude, mourning, and anxiety. It was a common occurrence for the sentinel to be seized at his post, and to have two or three successors before the two hours’ duty was performed ; many of the sick died before reaching the hospitals, and frequently their comrades, while bearing them from the outposts, sunk down, themselves seized with the disorder. The English soldier usually perished within six to twelve hours from the first attack, the Sepoy more commonly from three to six hours. At first, the natives bore the dead bodies of their countrymen to the river, but this consolation of their religion was, at length, denied them, for the mortality became so great that there was neither time nor hands to perform this last office, and the dead were now thrown into the neighbouring ravine, or else committed to the earth on the spot where they expired.”

The natives thinking that their only safety lay in flight, began to desert in great numbers, and the highways and



fields for many miles round were strewed with the bodies of those who had fled the camp. In this state of things, it was clear that unless some immediate check was given to the disorder, the entire camp must be broken up. The commander-in-chief, therefore, determined to move in search of a healthier spot and a purer air; and the ground of encampment and line of march is said to have presented, for many days, the appearance “of a field of battle, and the track of “an army retreating under every circumstance of discomfiture “and of distress.” The army, at length, crossed the clear stream of the Betwah, distant about fifty miles, on the 19th of November, and by taking up a position on the steep and dry banks of this river soon recovered their health,\* either from mere change of position, or more probably from a natural subsidence of the disease. From the military returns, it appears, that in this fatal week, 764 fighting men, and about 8000 camp followers, or nearly one-tenth of the whole died, so that one individual must have fallen every minute during the short period the disorder lasted.

The ground on which the grand army was encamped seemed to become a new centre of infection, and from it two streams of the virus penetrated along the high roads to the south, till the one reached Bombay in August 1818, and the other Madras in October in the same year, and by a singular coincidence, the cholera also reached both these presidencies at the same time by the routes from Calcutta. From Madras to Bombay, the infection proceeded southwards along the Coromandel and Malabar coasts, till in November, it reached Adam’s Bridge, the point nearest Ceylon on the eastern coast; and in January 1819, Travandrum and Palamcotta, towns on either side of Cape Cormorin, the most southern point of India.

About the same time, the cholera reached the southern extremity of the Peninsula of Hindostan, it appeared on the northern coast of Ceylon, and in course of the ensuing

\* Few cases occurred after the 23rd November, and none after the 8th December.

spring spread over the whole island, and early in November 1819, had reached the Mauritius, imported, as was supposed by the *Topaze* frigate from Ceylon.

From the coast of Coromandel and Ceylon, the cholera took a direction eastward, and crossing the bay of Bengal broke out on the opposite coast of Arracan in 1818, reached Penang in 1819, and made its way through the Indian Archipelago, devastating Java and the Spice Islands, till it reached Timor, its extreme south-eastern limit. In the Philipine Islands, the malady was marked by one of those terrific outbreaks of barbarian violence which have more than once marked the progress of this pestilence. The Chinese and Europeans were accused of magic by the natives, and numbers of them were sacrificed, so that 15,000 lives are said to have been lost in the struggle.\* In its progress to the north-east, it reached Canton in 1820, and Peking in the following year; and after committing great ravages in this populous empire, it passed the northern wall in 1827, and desolated several parts of Mongolia.

The cholera does not appear to have spread to the westward of India for about three years, but in July 1821, shortly after its reappearance in Bombay in the hot season, it broke out at Muscat, Bushire, and Bussorah, the three principal ports of the Persian gulf, and the principal marts of commerce between India, Persia, and Arabia. Its ravages were excessive, and, according to the Imaum, it exterminated 10,000 persons in the town of Muscat alone. At Bushire, it was even still more severe, so that the bazaars were closed, the houses abandoned, and the unburied dead lay heaped up in the streets, and one sixth of the population perished. Its attack on Bussorah, situated fifteen leagues from the sea, was so fatal, that 18,000 persons, or nearly one third of the whole population perished in about eleven days.

From Bussorah, the virus appears to have travelled along the course of the Tigris, so that in August 1821, it reached Bagdad, then besieged by the Persians, and many of the

\* Government Gazette, February 1, 1831.



inhabitants of that town, as well as numbers of the investing army, were carried off. From Bagdad it continued its course westward, following the route of the caravans, till in November 1822, Aleppo was infected, and for three days three hundred victims fell daily beneath this poison. In the following year, Antioch, and some of the ports on the coast of Syria were attacked, so that the cholera was now fairly established on the western shore of the Mediterranean.

At this point, the western stream of the virus appeared to be arrested, and the disease died away for several years. In May 1831, it appeared, however, at Mecca, just as the Moslem pilgrims had arrived from Persia, the Indies, and the Yeman countries, which were said to have been suffering under the epidemic at the time of their departure, and in four days 20,000 of their number must have perished.

When the cholera reached the Syrian shore in 1823, Egypt escaped, owing it was supposed to a rigorous quarantine, established by the Pacha, at the suggestion of the French council of health. The hurried flight of the pilgrims, however, from Mecca in 1831, so outstript the vigilance of the Pacha, that a column of 4000 had already reached Cairo before any measures of quarantine could be enforced. The cholera broke out at Suez and Coffier a few days after the arrival of the fugitives. A hurried cordon of the Bedouin Arabs was thrown across the road between Cairo and Alexandria, but unsuccessfully, for on the 21st of August many soldiers were attacked in the second line, and the ravages of the malady proceeded with such terrific force, not only among the troops, but among the inhabitants of the towns, that the hospitals were left without medical aid, the physicians attached to them, being either dead or else incapable of attending to their multiplied duties.

To return, however, to the Peninsula of India, after the attack on the grand army, the pestilence continued to ascend the Ganges, and by the 20th of July, 1818, it had reached Delhi, where it committed great havoc among the inhabitants of this imperial city, and about the same time it spread to the north devastating the high table lands of

Nepaul, Patun and Rhatgoun. The Himalaya range of mountains, however, entirely arrested the progress of the cholera in this direction, and long protected central Asia from the invasion. Pursuing a route to the north-west, it reached Lahore in 1827, and extended through the various intermediate districts till it finally attacked Cabul, and beyond this city all trace of the disease is lost, but it is apprehended it did not reach Persia in this direction.

From the ports in the Persian gulf, the disease extended northwards to Armenia and to the Caspian Sea, and reached Erzeroum in the beginning of August 1822, when the Persian troops, under the command of Prince Abba Mirza, amounting to between 30 and 40,000 men obtained a victory over an equal body of Turks encamped within a few days march of that town. The Persians were labouring under the cholera previous to this engagement, and, strange to say, if the disease be not contagious, the battle must have been fought on a new centre of infection, for the Turks became infected immediately after the contest had terminated, and the disease spread along the route, by which they fled till it reached Baku, on the south western shores of the Caspian Sea, which place was supposed to be equally infected by the northern route of the caravan from Ispahan. From Baku, it was supposed to have been conveyed by water to Astrakan, a Russian port, at the mouth of the Volga, on the northern shore of this inland ocean in the summer of 1823. But this year, it subsided after occasioning an inconsiderable mortality of one hundred and forty-four persons.

The progress of the cholera did not attract much attention in Europe during the interval which passed between 1823 and 1829, when it entered Russia by two distinct streams. The one extending from the northern provinces of Persia to the large and populous town of Astrakan, the other from central Asia, till it reached Orenburg, situated on the Tartar frontiers and about 400 miles north of the Caspian Sea, and these cities were attacked almost simultaneously, the former in September 1829, and the latter on the 26th of August 1829. In both these cities, the cholera quickly subsided,



but of the latter one tenth of the population were infected. How the cholera reached Orenburg is one of the problems of this disease, for the caravans had continued healthy, both during their route across the great steppes of the Kirghis-Kaissacks and also subsequently, and thirty-five days elapsed between the outbreak of the distemper and the arrival of the caravan at Orenburg.

Leaving this difficult question, we now come to the important period, when cholera again appeared in Astrakan in July 1830, imported as was then believed, once more from Baku, and from this point the disease now spread and gave rise to the great epidemic cholera of Europe. Its appearance in this quarter of the globe forms a new epoch, not only in the progress, but in the history of the disease, for, now in addition to the cold stage, it came armed with a severe and fatal fever which had not been observed or but rarely in India.

The disbelief in the contagious nature of cholera is general in India, but the Russian government took an opposite view of the subject, and attempted to stop its progress by establishing an extensive military cordon along their frontiers, and also by enforcing a strict quarantine. On the arrival, therefore, of the vessel on the 3rd of July, 1831, on board which the cholera prevailed, she was immediately sent together with her crew to the Sedlitovski Lazaretto, about sixty miles distant from Astrakan. But notwithstanding this precaution, four persons were taken ill on the 20th of July in the city of Astrakan (near the river Kirtum) and, subsequently, the disease imperceptibly spread over the whole town, and thence over the adjacent country causing a mortality of 4.043 in the city, and of 21.263 in the provinces. The well intended measures of the government were thus altogether unavailing, and from this point a new stream of virus emanated and passed with unexampled rapidity along the course of the Volga, attacking in succession the towns on either bank, till it reached that part when it approaches the Don. Here it gave off a branch which took an overland direction, and it again divided into two branches, the one descending the river to the south, penetrated in

the Cossack country and to the ports of the Black Sea, and thence westward till it reached Constantinople in July 1831. The other ascended to the north, and in spite of another military cordon, reached Moscow in September 1831. The inhabitants of Moscow were not only alarmed by this unexpected calamity, but were so greatly excited, that the Emperor regardless of his personal safety hurried off to the ancient capital of his dominions, and, by his presence, greatly contributed to tranquillize the public mind, and thus to alleviate one of the miseries of this great visitation. The winter set in, but the cholera unaffected and undiminished by its severity continued to rage with the snow covering the ground, and with the thermometer often at 35° below zero, till March 1832.

The cholera was now fixed in the heart of the Russian empire, and Moscow became a new centre from which three more principle branches streamed over this country, one taking a northerly direction reached Archangel in May 1831. Another accompanied the Russian troops in their invasion of Poland, while a third passed along the route to St. Petersburg which capital, notwithstanding another strong military cordon, the submitting persons from infected places to a short quarantine, and their goods to fumigation, it reached in the month of June 1831.

The Russian government had mixed with the army destined for the invasion of Poland, troops drawn from the Cossack country, which had been ravaged the preceding year by cholera, and from this cause it was apprehended the disease now raged in the Russian camp. The Polish army, as yet unaffected, gave battle to the Russians on the 10th of April near Inganie, and on the night of the 12th and 13th, only two days after, twelve Polish soldiers were attacked by cholera of whom six died. These accidents continued to multiply, so that by the 15th of April, fifty had died, and it was remarked that the greater part of the deceased wore some article of dress taken from the enemy. The disease now continued to spread in its usual frightful manner, so that the governments of Austria and of Prussia established a triple cordon of troops, along their respective frontiers



and submitted all persons passing them to quarantine—precautions equally futile on this as on every other occasion. Warsaw became infected after the battle, and from this city as from a new centre, the cholera pursued a course to the west following the usual law of adhering to the great roads and banks of rivers till it reached Berlin and Vienna. The former capital being attacked in August 1831, and the latter in September of the following year, and from these points it gradually spread nearly over the whole of Germany to the east of the Elbe till among other places it reached Hamburgh.

As early as the month of April 1831, orders were issued by the British government to place all ships coming from the Russian ports under a rigorous quarantine, and this order was subsequently extended to all vessels coming from places, where cholera was known to exist. But, notwithstanding this precaution, it broke out in Sunderland about the 26th of October 1831, imported, as was supposed, by a vessel from Hamburgh. There is no question of Sunderland being the town where cholera first appeared in this country, but there is much discrepancy as to the time of its appearance and the manner of its introduction. Dr. Ogden contends that sporadic cases were seen in August and also in September 1831, and consequently his opinion is, that the disease had a spontaneous origin. The advocates for contagion, however, contended that it did not appear till the 26th of October 1831, and was then introduced by a vessel from Hamburgh. The arrival of any such vessel, or at least of one having the cholera on board is, however, extremely doubtful and appears to have been altogether disbelieved by the British government, and to have been denied in Parliament.

Cholera was now established in England, and in consideration of the contiguity of the rivers Wear and Tyne, the shipping both of the ports of Sunderland and of Newcastle were placed under quarantine. Newcastle, however, and some inland towns becoming infected, the impossibility of preventing its spread was so manifest, that on the 8th of December, the quarantine restrictions were removed. The disease was, for a time, confined to the towns and villages in the immediate neighbourhood of Sunderland, but it shortly

spread to the north, and reached Edinburgh on the 6th of February 1832. The most remarkable fact, however, in the progress of cholera in England, is that it appeared among the shipping in the port of London on the 26th of the same month, caused most probably by an eruption of the virus from a new centre, for no intermediate town between the Thames and the Tyne was at that time infected. On the 22nd of March 1832, Dublin was attacked. Its course in Great Britain was not marked by any new feature, but it is exceedingly remarkable and a subject of great thankfulness, that although the cholera had lost nothing of its intensity on invading this island, but was exceedingly fatal to those attacked, it did not spread to the same extent, that it had done in many other countries on the continent. The largest calculation, being that during the three years it lasted, not more than 30,000 persons fell victims in the whole of Great Britain and Ireland. The cholera having thus reached the extreme point of western Europe now divided into two branches, one of which pursued its course westward till it reached America, while the other turned to the south-east and invaded France, Spain, and Italy.

The breaking out of cholera in France, supposing the disease to be contagious, presents a great anomaly; for while the eyes of all men were directed to the Rhine, as the most probable quarter for its invading that country, it simultaneously, or nearly so, appeared both at Calais and at Paris, (no intermediate town being infected), about the 26th of March, 1832. The mortality in Paris was infinitely greater, in proportion to the population, than in London, being\* 18,402, or, including the arrondissment of St. Denis and of Sceaux, 21,514; or more than two thirds of the total number that fell in the whole of Great Britain and Ireland, in the three years it lasted. Paris and Calais being thus infected, became new foci whence cholera spread more or less over the whole of France.

In September, 1835, when cholera had nearly ceased its

\* Rapport sur les effets de choléra morbus, publié avec l'approbation de M. le ministre du commerce, etc., p. 205, 1834.



ravages in the south of France, it penetrated into Piedmont, Genoa, Florence, and in September, 1836, reached Naples, while Rome escaped till August, 1837; Malta was also attacked about the same time. The city of Naples, so celebrated for the classical beauty of its site, and the transparency of its atmosphere, is a remarkable instance of the inutility of precautionary measures in preventing the introduction of cholera. The Neapolitan government, alarmed at its approach, surrounded the city with military cordons, and adopted the severest system of quarantine. The city nevertheless was infected, when the government thought by redoubling their efforts, that they might extinguish a disease they had so powerlessly attempted to repel. The patients, therefore, without reference to class or condition, were pitilessly torn from their beds, and carried to a distant hospital, appropriated to cholera patients only; while the physician, the relations, or whoever might have attended them, were sent to a Lazaretto on the coast, about three leagues from Naples. All the precautions usually adopted in the plague were put in force, and the physicians traversed the streets, covered from head to foot with a black sack, "*de toile cerée*" into which two pieces of glass were inserted to admit light. These measures, so terrific, alarmed the inhabitants, and in a few days 30,000 persons had left the city. The populace beginning to rise, the King found it necessary, to walk through the streets where the disease raged with the greatest violence—to eat of the bread which was believed to be poisoned—to visit the cholera hospitals, and at length to suspend the committee of health and all their regulations, so that the cholera patients were subsequently taken care of at their own houses.

A twelve month after making its appearance in England, it broke out in Portugal, introduced into that country, as was supposed by some troops landed from the London Merchant steamer, about two miles from Oporto on the 1st of January 1833, seven persons having died on the passage. It reached Lisbon twelve months later, and if propagated by contagion by land, for the Miguelite batteries would not

allow an enemy's ship to enter the Tagus, while Donna Maria's ships kept a strict blockade outside the bar. From Spain or Italy the virus passed over to the northern coast of Africa, the cholera breaking out at Algiers on the 14th of October 1837, and at Bona in September of the same year.

It is supposed that a branch crossed the Atlantic shortly after the cholera reached London, for it broke out in Quebec on the 8th of June 1832. This calamity was at first attributed to the large numbers of emigrants which usually arrive at this period of the year from England and Ireland, but says, Dr. Jackson, "a more close investigation into the facts connected with the commencement of the disease served to destroy this supposition. It could not be traced to importation." In Canada, the banks of the St. Lawrence, were found exceedingly favourable to the action of this poison for in this year 2200 persons died of cholera at Quebec, out of a population of only 30,000 including passing emigrants, while upwards of 3000 died at Montreal out of a population of nearly the same extent. The greater portion of these victims perished within a fortnight after the disease appeared, so that the mortality during that period was most appalling.

The lines of communication, between Quebec and Montreal with the cities of the United States were those by which it was confidently expected that the disease would penetrate into the latter country, but while the attention of every person was directed to the northern and western boundary, the disease suddenly and most unexpectedly appeared in the city of New York on the 4th of June 1833; all the intermediate towns, seaward, between New York and New Brunswick being at this time free from the disease. From New York, it spread north and south, attacking Baltimore, Washington and Boston in the month of August. Many other towns and districts of the United States were subsequently affected, but in no instance to the same degree as in Europe. It appears to have reached Mexico in the summer of 1833, but does not appear to have infected any more southern portions of the American continent. It is remark-



able, however, that it broke out at the Havannah, the capital of the island of Cuba, but did not assail any other part of the West Indies, thus sparing many islands having much more commercial intercourse than Cuba, and many countries as British Guiana whose soil and climate would seem more favourable to its development. In America as well as in all countries to which it is not native, this frightful disease subsided within two or three years after its appearance, but it still continues to rage in India, and, consequently, it is not merely probable, but certain, should any similar combination of causes arise, that it will again become epidemic and passing the barriers, which now restrain it, will again shed its pestilential bane over the surface of the globe.

Such is a slight and imperfect sketch of the history and progress of epidemic cholera, demonstrating its eastern origin, its power of existing in all climates, of spreading from country to country, and of contaminating new districts in such a manner as to render it probable that the poison, if not contagious, must be given off at depths of the earth below the action of atmospheric influences. At this point of the subject, a question necessarily arises as whether this origin or course is peculiar to cholera or common to other epidemics. A short account, however, of the course of influenza, a disease which has so often prevailed during the last fifty years, will show that this latter poison has a similar remote origin, is similarly unaffected by climate, and has pursued a course in almost every respect similar to cholera.

In the month of September 1780, an epidemic influenza broke out in Bengal and on the coast of Coromandel, and continued to prevail in India so long a time that the British army besieging Negapatam was attacked by it in November 1781. Whether it spread thence to China, or co-existed there is unknown, but it prevailed in that latter country also in 1780. From India, or, perhaps, more probably from China, its extreme eastern limit, it appears to have made its way to the west through upper and central Asia, to Tobolsk, a city of Russian Tartary situated about 58° north latitude. From Tobolsk, it continued to advance

in the same westerly direction till it broke out in Moscow, a distance of not less than 1200 miles, in December 1781, whence it spread to St. Petersburg in February 1782, and these are almost the precise stages by which the cholera penetrated into Europe in 1831-2. From St. Petersburg it continued its progress westward, so that in April it infected Denmark, and at the latter end of April in the same year, it appeared at Newcastle-upon-Tyne, almost the identical spot where cholera first appeared in England. It was certainly in London the second week in May, and as in cholera without any of the intermediate towns being infected. In Scotland and in Ireland, it appeared rather later than in England. It is also exceedingly remarkable that this epidemic, like the cholera, prevailed earlier in England than in France, for it did not reach Paris till June. Again it is singular that having reached France, it commenced a short retrograde course to the south east, passing from that country into Italy, where it prevailed in July and August, and also into Spain and Portugal, which it attacked in August and September. A course precisely similar to that of cholera.

That this course of influenza is not accidental, but according to some definite law seems proved by the fact of influenza always originating in the east, and following a westward course not limited to Europe, for in 1837, like cholera it crossed the Atlantic and prevailed in America, and in the West Indies. The law of the diffusion of cholera, is consequently in no degree dissimilar to that of influenza—each having its origin in the east, and each steadily pursuing a westward course through the north of Europe, till, at a given point, the stream breaking into two branches, one has returned for a short space to the south-east while the other has often crossed the Atlantic, and infected the northern shores of America. It seems to follow, therefore, that the two poisons must be of the same class, since their manner of diffusion is governed by the same laws. At this point, one general inference may be drawn, or if influenza is not a contagious or infectious disease, or too slightly so to account for its wide and ex-



tensive spread over the whole or nearly so of the northern hemisphere—it follows, neither is the doctrine of contagion necessary to explain the progress of cholera, and, consequently, the proof of this property, if it does exist, must depend on the usual evidence derived from intercourse with the sick. It is time, however, to return to the consideration of some peculiarities in the modes of progression of cholera, to mark the rate of its course, the nature of country it affects, the length of the epidemic season, and the other circumstances illustrative of the habits of this singular poison.

The mode of progression of this poison it will be seen is extremely remarkable, for originating in India, it spread east and west till having reached China, its extreme eastern point, the stream suddenly wheeled round to the west, and pursuing its course through Tartary and joined in the attack on Europe. On the contrary, the western branch having reached England, the extreme point of western Europe, the stream has suddenly retrograded to the east through France, Spain and Italy, to Malta, where it seems to have become evanescent. In pursuing its westward course, it appears to have been developed in two different manners, probably according to the nature of the country, sometimes forming one or more centres from which disease has radiated in every direction, and again running in lines of no great breadth, the country on either side being healthy. The instance, of its acting eccentrically were manifest in its outbreak at Jessore and Calcutta, and also at London and at Paris, the country around these capitals being in each instance extensively infected. The examples of its acting in lines or belts are numerous. In the case of the attack on the camp of the Marquis of Hastings, the space of fifty miles made the difference between exemption from the disease, or death. There were, also, many instances of corps marching in India in parallel directions at small distances from each other, and even keeping up the most free communication, and yet in the one the cholera has been raging, while the other has continued

healthy. In other instances,\* “the disease would sometimes take a complete circle round a village, and leaving it untouched, pass on as if it were wholly to depart from the district. Then after a lapse of weeks or even months it would suddenly return, and scarcely reappearing in the parts which had already undergone its ravages would nearly depopulate the spot that had so lately congratulated itself on its escape. Sometimes after running a long course on one side of the Ganges, it would, as if arrested by some unknown agent, at once stop, and taking a rapid sweep across, lay all waste on the opposite bank.” The same fact was also observed in Canada.

The above extract is curious as it shows that not only do the great streams retrograde in their course, but that the minor currents also follow in many instances the same law. Another remarkable circumstance in the laws of this poison, is that its course appears to be intermittent, often passing as it were “per saltum” over many large cities and districts that lay in its direct course, in general only delaying to strike, for in the end most of them have suffered, and that most severely. Thus, in its progress along the Ganges in the year 1817, it passed over many large towns and cities, as Banda, Allahabad and Benares, places which lay in the direct road from Calcutta to the camp of the Marquis of Hastings, although they kept up a constant intercourse with the infected points. Unhappily, however, they all suffered severely in the following year.

The same fact of intermission was observed also in France when it attacked Paris seventy leagues, at least, distant from any infected point. The department of the Indre was, although the departments de Loire et Cher de la Nièvre, and d’Indre-et-Loire, surrounding it, were not attacked till a month afterwards. By “nouveaux sauts”† it burst forth in the remotest parts of the south and west of France, as in the departments d’Ile et Vilaine, des Côtes du Nord, de la Ven-

\* Report of the Calcutta Medical Board.

† Fuster’s *Maladies de la France*, p. 286.



dée, du Morbihan, de la Gironde, de l'Ardèche, de l'Isère, des Bouches du Rhône, &c., all which were isolated from communication with the cholera districts, yet became new centres of infection.

In some fortunate instances the country over which the cholera has thus passed without being infected has escaped altogether. Hanover, for example, with the exception of Lunenburg escaped, so also did the principal towns in Saxony, as Leipsic and Dresden. The principal cities of Saxon-Weimar, Gotha, Anhalt, Hessia, Brunswick, Mecklenburg, and Bavaria likewise escaped the disease, as did many countries to the south of Vienna, as Carinthia, Stiermark, and the Tyrol though surrounded by infected districts. Neither could this immunity be accounted for by any natural boundaries, as mountains or rivers, for the limits between the infected and non-infected districts were in most cases merely conventional. Many large cities in France, as Lyon and Montpellier are said to have escaped altogether, and in England, also, many considerable districts and cities must equally have escaped, for according to official documents furnished by Sir James Clarke to Dr. Graves, only two hundred and thirty-five towns and forty-one counties were infected in England and Wales. The cholera, therefore, has not in all cases proceeded step by step, but has often burst forth at various and distant points, each forming a new and separate centre of infection.

Although the great streams of cholera have, on the whole, steadily advanced, they have not proceeded at an equal pace, the rate of progression varying greatly in different countries. In the year 1817, the cholera had overrun in India, in three months, a space westward of not less than four hundred miles, while to the south it had penetrated no further than Ganjam, only eighty-eight miles from Calcutta in six months. In the next six months, however, it had extended in a southerly direction from that point over more than four-fifths of the Peninsular. It reached Pekin in about the same time that it attacked Muscat, the former being twice the distance of the latter. In Europe its progress was equally

capricious. It travelled from the Caspian to Vologda and Pskou, within one hundred miles of the Baltic, at a rate which would have infected all Europe in three months, while it did not reach Riga, only one hundred and eighty miles distant from the latter town until eight months after. Its rate, however, appears to have been most retarded in its retrograde movement, for it took six years after London was infected to reach Rome. In a word, it took only a year to span the base of the Peninsular of India, while it occupied twenty years to compass the globe.

The poison of cholera primarily generated in Bengal during the heats of a tropical summer, appears like that of influenza to be little affected by temperature; for the disease has raged in Europe with as much violence at Moscow, when the thermometer fell to 35° below zero, as in India at Jessore, when the thermometer stood at 90° to 100°. Mr. Scott whose "Madras reports" do him the highest honour, says that, "cholera is equally violent during all " states of the atmosphere, amidst all diversities of the " surface of the country, and under every variety of the cir- " cumstances of the people." Again, "that the appearances " of the epidemic at stations, and in corps during cool, and " during hot weather are very nearly equal in point of " number, but have been doubly more frequent in dry than " in wet weather." Mr. Jameson also states, "that in " Bengal, the cholera again and again has arisen, fallen and " reappeared during all periods of the year, and under every " possible variety of heat, cold, dryness and moisture. In " Upper India, as in Benares, Bundlecund, Oude, and the " southern divisions of the Doab, it raged violently during " the dry months of the hot weather, while in Delhi, Merat, " and Jessore it equally prevailed after the rains had set in, " and the air was loaded with moisture." Of the five camps attacked by it he adds, "the centre division was attacked in " cold weather, the Nagpour and Sangor divisions in the " height of the winds, and the Rajapootana and Kurnaul " divisions while it poured down with rain." Mr. Jameson has reduced into a table one hundred and twenty-nine sepa-



rate instances of the appearance or disappearance of the disease in different camps, cities, or districts in Bengal between 1817, 1819, with their dates or nearly so, and the number of attacks in each month was as follows :

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	3	10	18	23	14	10	22	16	7	5	0

Mr. Scott in a similar table, gives the dates of fifty-one appearances of the cholera among the stationary troops or inhabitants of places in the Peninsula in 1819, and the four succeeding years, and the number occurring in each month is as follows :

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
6	1	3	6	8	10	7	2	3	2	2	1

In Europe as in India, cholera has likewise prevailed in all seasons. It broke at Edinburgh in January, at London in February, at Paris in March, at Warsaw in April, at Dantzic and Riga in May, at Archangel and St. Petersburg in June, at Berlin in August, at Moscow and Vienna in September, and at Sunderland and Orenberg in November. Few diseases, indeed, have shown themselves capable of existing through so great a variety of temperature, or to be so little affected by extremes of heat and cold ; for cholera has equally prevailed in Europe in the depth of a Russian winter ; in Poland in the midst of a rapid thaw, when the troops were up to their knees in water ; and in London and in Naples in the height of summer.

But although cholera like influenza has appeared in every country within the northern hemisphere at all periods of the year, and under every degree of heat or cold, of dryness or

moisture, it is remarkable that there is in India a period termed the cholera season. In Bengal, for instance, this season usually begins with the heats of March and April when the cases are few, in May the disease is generally at its height, and is more or less epidemic, while in June and July it begins to decline, and on the setting in of the cold weather in October, it so far disappears that the cholera season is said to be terminated for that year. Even in India, however, the season is often much shorter. Thus the cholera appeared in the camp of the grand army on the 6th November, and the last case occurred on the 8th December. In the city of Madras, the disease commenced on the 18th of October, but subsided early in November. In the Mauritius, it commenced about the middle of November and subsided early in January, at Shiraz in the Persian Gulf, it began on the 15th September and subsided before the middle of October, and in Benares it broke out 23rd October, and terminated in the first week of December.

In Europe, the season has been of longer duration. In Moscow it lasted from the 20th September till the end of the following March. Its eruption in Paris commenced the 24th of March, and certainly had not subsided on the 31st of August.\* In London it appeared early in February, and although clean bills of health were granted, and the quarantine restrictions removed the 18th of May, it was well known that cases continued to occur for many weeks afterwards, but were not reported owing to the financial embarrassments consequent on the shutting of the ports. This law of limited duration of season, notwithstanding a large portion of the population appears still susceptible of the action of the poison, is one of the most remarkable circumstances in the history of cholera, and is common to most epidemic diseases.

The season of cholera is also marked by another circumstance common to most morbid poisons, the intensity of the disease, and the numbers attacked varying at different

\* Je termine cet ouvrage aujourd'hui 25 Juillet, 1832 ; l'épidémie règne encore avec intensité.—Gendrin, du Cholera-morbus épidémique de Paris, p. 334.



periods; for the season has its commencement, height, and declination. At its commencement, the numbers attacked are few, but the mortality great.\* At its height, the numbers attacked are larger, but the mortality proportionally less, while towards the decline, the numbers attacked are, perhaps, at a maximum, but the cases are milder, and the number of deaths gradually decreases till it becomes evanescent.

Although cholera has raged in countries of every altitude,—has devastated the high table lands of Nepaul, and even attacked the medical depot at Landour, situated 8000 feet above the level of the sea, a height which in Europe is almost the region of perpetual snow, yet in general it follows a law common to many other epidemics—or a marked disposition to affect low, marshy situations, and the banks of rivers, while healthier and more elevated tracts have been more slowly attacked and more quickly freed from it. For instance, when it broke out in 1817, it crept along the banks of the Megna to Narriangunge and Dacca, attacking the ferries and market places in their vicinity. In like manner it advanced step by step up the Burrampooter, affecting the villages on both sides of that river, while the shipping at the new anchorage in Diamond Harbour, and along the whole channel as high as the Hoogly suffered greatly. From the mouth of the Hoogly, also, to its termination in the Ganges, almost every village adjacent to its banks buried many of its inhabitants. In the Blangulpore district, this propensity was so strong, that while cholera depopulated the low lands near the Ganges, it scarcely ever spread into the interior. At Allahabad, the Jumna and Ganges unite, and until the latter river is lost under the hills, the cholera wavered so little from its course, that hardly a village remote from its banks was affected, and the same phenomena were likewise observed along the Nerbudda, the Caverry, the Burrampooter, the Jumna, and, indeed, of the rivers of India generally.

\* Gendrin states, that in Paris 12,681 persons died in the first 35 days, or 1 in 60 $\frac{3}{4}$  of the population, being the greatest mortality in any well-built capital in Europe, (p. 290). By the end of August, 17,978 had fallen.

Next to the banks of rivers, the jungle, the marsh, and the paddy grounds suffered most, and after these the plains. In India it has been stated, although the elevated tracts and table lands were not wholly exempted, still the attacks in such districts were few and mild compared with those of the plains. Thus, many hill forts and isolated mountains, as Khotass, Adjeghur and Killingar enjoyed an entire immunity, while in the plains around their feet, the pestilence was carrying off its tithe of victims. In general, the villages in which cholera raged with the greatest violence were those considered by the natives as being the most unhealthy and obnoxious to intermittent fever. In Europe, and also in America, the same tendency to adhere to the towns and villages situated on the banks of rivers, or in the neighbourhood of marshes was very generally observed.

If the cholera has been influenced by the great features of the country in its progress, the same circumstance has been observed on a smaller scale in camps and cities. In cities it has been constantly found that low damp, crowded, and confined districts have suffered more than the higher and better built quarters. In large camps, also, it has been found that corps which have been in position near the rivers have suffered greatly, while those on higher ground and more remote have escaped. In Sylhat, the low country to the east of the Burrampooter and which abounds in marshes and extensive lakes, the disease caused a great mortality among the native inhabitants, but the sépoy lines, on the contrary, placed from 60 to 100 feet above the level of the country had scarcely any men affected, except those on guard at the different out-posts.

Another remarkable circumstance relating to this poison, and which is perfectly inexplicable, and not known to be common to any other morbid poison is that in Europe and America, the disease has been accompanied by a series of new and fatal symptoms unknown or nearly so in India—a second stage of febrile re-action being added, and which has more commonly destroyed the patient after he has successfully struggled through the cold stage.



It is generally supposed that when severe epidemics prevail, all other diseases disappear, and that the patients that die fall from the reigning disease. It has been a question, therefore, whether the years in which cholera has prevailed have been in other respects healthy. In India, however, and in this country it seems proved that the amount of sickness, and consequently of mortality was greater than usual, for it appears throughout northern India, the epidemic year was remarkable for remittent and autumnal intermittent fevers for diarrhæa, dysentery, and small pox.

The medical returns of the Madras army, also, show a marked increase of disease generally during the years that cholera raged so severely in that presidency, the proportion being from one-fifth to one-sixth greater than usual. In Europe, this fact has been variously stated. In Russia, for example, it was thought the total number of deaths was not increased. In France, however, the number of deaths in the cholera years greatly exceeded that of ordinary times. In the north of England, it was said that typhus fever disappeared. In London, however, typhus fever raged with great violence, assumed new characters, and was more fatal and intractable than had been witnessed for many years, and according to the bills of mortality, the burials in 1832 exceeded those in 1831 by 5098, or more than one-fourth. The mortality from cholera is extremely difficult to ascertain, and must have varied greatly in different countries and in different localities of the same country. In London, however, it was calculated at four-half per 1000, or rather less than a half per cent., a number too small to explain the large amount of mortality that has been mentioned, and consequently the year must have been exceedingly unhealthy.

Having thus stated the more prominent laws or habits relating to this singular poison, independent of its action on the human body, it only remains to add that in all countries to which the disease is not native, the cholera has hardly in any instance continued to rage beyond three years. The number attacked and the proportionate mortality, being greatest in the first year, and then declining in each suc-

ceeding year till the disease has, at last, become altogether evanescent. It is singular, however, that in 1837, or three years after it had subsided in England, when the disease was raging at Naples and Rome, that twenty cases occurred on board the seaman's Hospital ship the Dreadnought, moored off Greenwich, and which proved fatal in twelve instances, and some cases are said to have occurred about the same time at the Marylebone Infirmary, while a total of four hundred and sixty cases, are said to have occurred in England and Wales in that year. It is stated, also, by Dr. Farr in the second report\*, of the Registrar General, that in the beginning of January 1838, twenty-seven males and twenty-eight females died in the house of Industry at Coventry of cholera.

*Predisposing causes.*—The various periods of life have been found to be distinctly marked by various degrees of susceptibility to cholera, and in the army, it appears by the medical returns that the deaths from this disease have been nearly in the direct ratio of the age of the party. The following table formed from Major Tulloch's statistical reports will distinctly prove this to be the case.

Age.	Mortality in the household troops from cholera per 1000 mean strength.	Mortality of troops in Canada from cholera per 1000 mean strength.	Gibraltar.
under 18 years	.0	.0	.0
from 18 to 25	2.3	15.5	47
25 — 33	2.5	25.—	41
33 — 40	4.—	36	54
40 — 50	4.9	70.4	60

In civil life although the calculation is less to be relied on, the mortality has in almost every country increased with advance of age. The deaths from cholera in Paris, were estimated at 18.402 or 23.42 per 1000. Of this number it



was remarked that the mortality was least from six years to twenty, greater from thirty to forty, and greatest in old age. In Philadelphia according to Dr. Jackson, the same progression was observed.

Age.	Deaths.	Ratio to Population.	Age.	Deaths.	Ratio to Population.
under 1 year.	4	1 in 604	between 40 & 50	159	1 in 46
between 1 & 2 y.	4	1 — 503	— 50 — 60	100	1 — 28
— 2 — 5 —	30	1 — 912	— 60 — 70	71	1 — 102
— 5 — 10 —	39	1 — 919	— 70 — 80	47	1 — 212
— 10 — 15 —	19	1 — 188	— 80 — 90	5	1 — 36
— 15 — 20 —	22	1 — 96	— 90 — 100	1	
— 20 — 30 —	179	1 — 81	— 100 — 110	1	
— 30 — 40 —	228	1 — 60		999	

The *sex* probably has an influence in predisposing to cholera, though this fact cannot be considered as quite determined, as the proportion has greatly varied in different countries. In Calcutta, Mr. Jameson states, that it appears from the returns that of the native inhabitants attacked by cholera, the males were to the females as four to one. In Bombay, the reverse appears to have been the case, the deaths of the women being to those of the men as two hundred and fifty-four to one hundred and seventy-two. In other parts of India, also, the results were equally opposed. In Canada, the soldiers wives were observed to suffer nearly in an equal proportion with their husbands, and this was the case at Gibraltar among the civil inhabitants.

Sex.	Estimated numbers of the civil inhabitants of Gibraltar.	Number attacked by cholera,		Died.
		Severe.	Slight.	
Men . . . . .	6000	193	345	104
Women . . . . .	5000	216	267	107
Children . . .	6000	50	95	41

In Paris, up to the 20th of July, 1832, of 12,259 persons attacked with cholera, 6,243 were men, and 6,106 women. The number of children affected are said to have been few, but the proportion of deaths great. Up to this period only 693 had fallen under seven years of age, and, of these, some were not more than four months old.

In estimating the effects of cholera in the different classes of the population, it is universally admitted that *the lower classes* have, in all instances, suffered in a much greater proportion than the upper classes. In India, says Mr. Kennedy,\* “The city of Palaces, forms only one half (the “English) of the city of Calcutta; the other is the native “town which contains in connection with the suburbs at “least 500,000 inhabitants. The native town is com- “posed chiefly of miserable lanes—narrow, dirty and “unpaved, and the majority of dwellings are low huts, with “side walls built of mud, mats and bamboos, and covered “with small tiles. Amongst the swarming population of “these filthy receptacles, in which all descriptions of disgust- “ing animal and vegetable odours abound, the distemper “ran a wide career of destruction.” In Bombay, likewise it was observed that the malady was chiefly confined to the natives, few Europeans being attacked and those seldom of the higher classes. In general, also, it was found among the native inhabitants of the Peninsula, that the Brahmin and Banian merchant suffered less than the Ryot, “who pays often as much as half the produce of his rice “field to government, and the Ryot still less than the “poor outcast pariah who carries a burthen ten miles and “returns the next day empty-handed for five-pence sterling.”

In Europe the same devastation among the poorer classes was observed. When Moscow was attacked, the mortality was severe, only among those persons living in dirty, low, damp habitations, whose diet was poor and whose conduct was irregular and debauched. The same fact



was also observed at St. Petersburg, for in ninety-nine cases out of one hundred, the victims according to Dr. Gill, were the drunkard, the dissipated and the poorly fed, and it may be stated as a general principle, that the ravages of the disease have been confined nearly to the same class of persons throughout the whole of Prussia and Germany. In Paris, likewise, it was determined, that by far the greater proportion of loss occurred among the poorer classes, and if we may take the eleventh arrondissement, their principle residence as an example, it was estimated that in this district one half of the inhabitants were attacked by the cholera, while in the better quarters of Paris, the ratio was only one in six. In London although the higher classes did not altogether escape their proportionate loss, was infinitely less than among the lower classes.

In military life, it has generally been supposed that the European soldier serving in India suffered less than the sepoy. This, perhaps, is true in some instances, but the returns of the Madras army, shew this not to have been the fact in that Presidency; for the number of Europeans attacked in this branch of the service was 3664 out of 10.112 numerical strength, or more than one in three, while of the sepoy force consisting of 71.234 numerical strength, only 15.830 or one in four and a half suffered. The sepoy, however, when attacked appears to have fewer chances of recovery than the European, for the latter force, lost only nineteen per cent of those attacked, while twenty-three and a half per cent of the former perished.

Among the troops, likewise *difference of class*, as in civil life, appears to produce great difference in the liability to attack. "In India," says Mr. Orton,\* "the officer suffered less than the soldier, the cavalry than the infantry, and these again less than the hard labouring, ill-fed camp followers." In some instances, the difference of liability between the officers and men of the different armies has been extremely remarkable. Thus, during the first outbreak

at Bellary not one officer, out of at least fifty at that station, was attacked. In the severe attack of the 34th regiment, not more than two slight cases occurred in a body of thirty officers, while, of the men one in eight was admitted into the hospital and many died. In the centre division of the Bengal army, according to Mr. Jameson, during the week in which the epidemic raged with so much fury, that "the camp was a sick ward and every tent was filled or surrounded with the dead or the dying." The officers suffered comparatively very little for out of a number that could hardly have fallen short of three hundred, only five or six deaths occurred.

A difference of liability to cholera, is found not only to exist between the officers and the men, but as has been stated exists also between the cavalry and infantry soldiers, for the mounted troops are found to be less frequently attacked than the infantry. Mr. Scott states that out of thirty-four instances of cholera in the marching corps, the cavalry were only once attacked. There have, however, been many instances in which the cavalry have suffered severely. These facts seem to prove that, although little is effected by medicine in the amelioration of the disease when once formed, yet that a generous diet, regular habits and attention to the premonitory stages have a powerful influence in diminishing liability to cholera.

But, although a generous mode of living has been found to give some exemption from cholera, yet excess or *errors in diet*, have in all countries, been found powerful predisposing causes to the disease. Indulgence in unripe fruits, wines, raw vegetables, or in any other article, that has a tendency to cause indigestion has been productive of the most severe and fatal cases of cholera. In Paris it was observed that the excesses of Sunday increased by one eighth the entrance into the hospitals on Monday. At Buhampore in 1828 a sum of 15,000 rupees prize-money, was distributed to the soldiers of H. M. 14th regiment. A good deal of excess was the immediate consequence, and within a few days ninety-four cases of cholera were admitted



into the hospital. Mr. Kennedy states\*, when the cholera broke out, two bodies of men, one amounting to three hundred and the other to one hundred were located in adjoining situations. The smaller body determined to live temperately and to avoid night air and other predisposing circumstances—a plan which succeeded so well, that only one individual was seized out of the hundred. The larger body adopted no precaution and they lost one tenth of their numbers.

It has been objected that the natives of India are perfectly temperate, yet do not escape cholera, but this virtue is as much the result of poverty as of superstition. The pay of the sepoy is about five pence a day, and most of them have families to maintain, and this is affluence compared with the grooms, porters, tent men and others, who do not receive more than from one half to two thirds of that sum, and there are others again still lower in the scale, and to whom these are objects of envy. The diet of the Hindoo is, consequently, poor and consists principally of rice, or other grain, boiled whole or made into cakes, the insipidity of which is in some degree removed by a sort of thick soup composed also of vegetables, seasoned with a great proportion of condiments. The food of the native Indian, is, consequently, deficient in nourishment and often in quantity, and his physical strength so ill developed that he is exactly that class of person whom we daily see become the ready victims of almost every morbid poison.†

The fatal effects of this poor diet will, perhaps, be better understood by stating that the Mohammedan population of India, indulges in a more nutritious diet, is better clothed and suffers in a much less proportion than the Hindoo. It chanced, however, that cholera prevailed at Delhi, at the

\* P. 91.

† Mr. Martin states, that owing to the better food and clothing of the Mohammedan portion of the inhabitants of Calcutta, but one in  $38\frac{1}{2}$  die annually, whereas of the Hindus, the annual mortality is 1 in  $17\frac{1}{3}$ .—Med. Chir. Review, Jan., 1841, p. 39.

period of the year, when the Mohammedans observe their annual fast or Ramazan, which obliges them to rigidly abstain from food as long as the sun is above the horizon, and during this fast they were observed to suffer in a larger proportion than the Hindoo from cholera. The rigorous fast, also, observed by the Jews in Poland, on the death of their relations is supposed by Brierre de Boismont\*, to have caused them to have suffered more in proportion than the rest of the population. The greater mortality, also, among the Parisians compared with that of the inhabitants of London is attributed to the diet of the lower classes in France being generally less nutritious and abundant than in England.

Besides a poor and insufficient diet, exposure to the vicissitudes of the atmosphere and to fatigue, greatly predispose to this disease. This is strikingly exemplified in the Indian army which appears rarely to have moved of late years without suffering from cholera. Mr. Scott has estimated the total number of deaths in the Madras army in the year 1818, and the four succeeding years at twenty-two and a half per cent, while in the marching corps, it reached thirty-six and a half per cent. The army is, consequently, more liable to be attacked on a march, or in camp than in quarters. It appears also that the population in towns, suffer less than the troops even when in quarters, for the loss among the civil inhabitants of Bombay did not exceed seven and a half per cent by cholera, an immense difference of mortality, when compared with that of the troops. In Paris, also, and in the arrondissements St. Denis and of Sceaux, the inhabitants suffered only in the ratio of 22.75 per cent of the population, while the military suffered in the larger rate of 25.66 per cent, of their numerical strength. A still greater difference of liability, was observed between the civil and military population in Gibraltar, for the former lost only seventeen per cent, while the latter suffered in the large ratio of forty-three per cent.†

\* P. 104.

† Statistical reports, p. 13 a.



In general it has been observed that, whatever the class attacked, the strong and healthy individual was much less frequently attacked than the feeble, the diseased or the convalescent—and there can be no doubt as a general principle that this was the case. Many strong persons fell in the plenitude and vigour of health, but more commonly the weak and those recovering from sickness were its victims. All tendency also to diarrhæa was a predisposing cause, and as most of the patients were attacked during the night, it would appear that sleep was a predisposing cause.

*Susceptibility exhausted.*—The number of persons who actually contract this disease appears happily to be small in comparison with that actually exposed to the influence of the poison. The proportionate number has so varied at different times, and in different countries as to set at defiance all attempt to deduce an average. Mr. Scott states, that in the marching corps, chiefly sepoy, the numbers ranged from seventeen to three hundred and thirty per corps, of about 1000 men—being on the average about twelve per cent. In civil life and even in all the wretchedness of the native Indian towns, in no instance has the community suffered to the whole extent of its population. In Europe, Moreau de Jonnès has given the following estimate as an approximation to the probable numbers attacked in different countries. In France 1 in 300, Russia 1 in 20, Austria 1 in 30, Poland 1 in 32, Prussia 1 in 100, Belgium 1 in 120, Great Britain and Ireland 1 in 131, Holland 1 in 144, Germany 1 in 700.

The circumstance of one attack, however, by no means arms the constitution against a second, although a repetition of the attack is rare. Mr. Jameson says, “that to many  
“ medical officers who possessed large opportunities of ob-  
“ servation, there did not occur in a single instance in the  
“ same season, and that the centre division of the Bengal army  
“ hardly afforded half a dozen instances. In the left division  
“ and Rajapootana force, according to the unanimous decla-  
“ ration of the medical staff, no case of re-seizure occurred  
“ after the strength of the patient had been fully restored,

“ In the Nagpore force two or three instances came to  
“ notice, but all came under the strict denomination of  
“ relapses, with the Kurnaul division not a single case  
“ offered. The same immunity from secondary visitation  
“ was observed in every quarter in which the epidemic pre-  
“ vailed; and we should, perhaps, be not far wide of the  
“ truth were we to affirm of the many myriads attacked, the  
“ returns of the whole country do not afford a score of well  
“ authenticated cases of the occurrence of the disease after  
“ the removal of the debility, and every other consequence  
“ of the primary attack.” These facts are sufficient to show  
that the recurrence of the disease is rare in the same person  
during the same season, so that in this respect cholera follows  
the laws of most other epidemics. There were several instances,  
however, of relapses both in St. Thomas’s and in the other  
hospitals of London, and most of them terminated fatally.

*Co-exists.*—The poison of cholera is capable of co-existing  
with many other poisons. Several patients were attacked in  
St. Thomas’s Hospital while labouring under syphilis. In  
the archives générales, a case is given of a patient labouring  
under small-pox being attacked, when the pustules imme-  
diately shrivelled and dried up. Typhus fever and cholera  
ran constantly into each other, and sometimes cholera ter-  
minated in intermittent. No disease has yet been remarked  
as giving an exemption from the action of the poison.

*Modes of absorption.*—We possess no data to enable us to  
determine by what tissues the poison is absorbed. It must  
unquestionably be either by the mucous or cutaneous tissues,  
and probably affects the blood for that fluid is found greatly  
altered, certainly in its constituent parts, if not in its che-  
mical qualities.

*Period of Latency.*—The period of latency probably varies  
considerably. There are circumstances, however, which ap-  
pear to show that in some instances it is extremely short. The  
King’s 41st regiment arrived in two divisions from England;\*

\* Madras Reports, p. 23.



the first division landed at Madras on the 10th of May 1832, and marched into quarters at Fort St. George, and as the voyage from the Cape of Good Hope had been performed in twenty-eight days, the men were in a high state of health. Within three days, however, the cholera broke out among them, and continued till the 1st of July. In Hindostan three days seem to have been considered as a general rule, the longest period of latency. There are some cases, however, which would seem to favour the belief that it may extend to a week. Mr. Scott for example, gives the case of a vessel which sailed from India and reached the equator before the disease broke out. The particular port is not mentioned, but a voyage from India to the line is seldom made in less than a fortnight. The case of the barque Brutus is more in point, this vessel left the Mersey on the 25th of May, and the disease broke out on the 2nd of June or eight days after; the vessel returned to port having had one hundred and seventeen cases of cholera, of which eighty-one died. Another instance is the brig Amelia which sailed from New York for New Orleans, 19th of October 1832, on the sixth day the sickness commenced and twenty-four persons died during the voyage.\*

*Pathology.*—The theory of this disease is that a poison is absorbed and infects the blood, and that after a given period of latency it produces disordered function of the chord, of the eighth pair, and of the great sympathetic; for the temperature of the skin is reduced much below the natural standard—the muscles are convulsed with cramp—the urine and bile suppressed, the blood coagulated and unoxygenated—while the secretions from the alimentary canal are singularly and frightfully abundant. The only organ which appears to escape in this stage, is the brain whose functions still continue unimpaired. The depressing influence of the poison so great, that life has often been destroyed in a few moments, and not unfrequently in two or three hours. It will be plain that so active a poison thus suddenly overwhelming all nature's

\* Graves on cholera, Dublin Journal, vol. xvi. p. 393.

efforts of resistance, does not allow time in such cases for any secondary or specific actions to be set up in this first stage. In those patients, therefore, who have died within forty-eight hours of the attack, rarely has there been found any alteration of structure in any organ or tissue, unless the disease has been preceded by long continued diarrhæa, in which case the follicular structure of the intestinal canal has been found to be enlarged.

If the disease passes into the second stage, the specific actions of the poison are now set up, and fall principally on the brain and its membranes; for the organic lesions of structure are almost identically the same as those which are found in typhus fever, or inflammation of the serous membranes of the brain, and less frequently of some portion of the mucous membrane of the alimentary canal, and particularly of the follicular structure, and also of the parenchymatous substance of the lungs.

When death, therefore, has taken place at a very early period of the disease, the morbid appearances are limited to the external surface, and are quite characteristic; for the body preserves most of the appearances which marked the cold stage during life, though, perhaps, in a less degree, presenting the same blueness of the nails, the same contracted and shrivelled state of the skin, and the same collapsed state of countenance. Examined internally, black blood is found in both ventricles of the heart, and also in the arteries and veins, shewing that the functions of the lungs had ceased before those of the circulating system. The urinary bladder is also found contracted and empty.

When the patient has survived a longer period, but still fallen during the cold stage, the same external appearances are found. Gendrin, however,\* has observed the subcutaneous tissue of the congested parts, and especially of the orbits to be easily torn, and the veins which traverse them to be much injected. When the chest is opened, the lungs are found singularly contracted in one half the cases, while they are gorged and congested with venous blood in

\* P 88.



the other. The former appearance has been supposed to have been caused by the extrication of gas within the cavity of the pleura, but the thorax has been opened under water and no gas has escaped; Mr. Scott is, therefore, disposed to ascribe it to a contractile power exercised by the bronchial fibres sufficient to overcome the pressure of the atmosphere. The bronchi are also filled with mucus.

In the abdomen, the intestinal canal has been found throughout its whole length to be more or less filled with a turbid, inodorous, semi-diaphanous fluid, usually amounting to two or three pints, the remains of that immense secretion which has taken place during life. This fluid though usually colourless has occasionally been seen of a dark venous hue, and when tested it has been found sometimes acid and sometimes alkaline. A layer of greyish mucous has, also, been found coating the whole of the mucous membrane of the alimentary canal, but traces of bile although the gall bladder is usually filled with that fluid, or of any substance that has passed the stomach have been exceedingly rare. In no instance has any fœcal matter been found.

The alimentary canal having been cleansed from its contents, the mucous membrane from the mouth to its anal extremity has, in some cases, been found perfectly natural, or has offered no other peculiarity than great congestion of the subjacent veins imparting to it a livid tint. This state of congestion has often existed throughout the whole of the alimentary canal, but has been least so in the colon. When, however, the mucous membrane has been detached, in most cases it has been found white and healthy, in others it has been congested. In about one third of these cases, the mucous follicles have been found enlarged.

In cases of still less severity, and, consequently, of longer duration, the mucous membrane of the stomach has presented a *mammellated* appearance. This appearance is attributed by Gendrin to an enlargement of the mucous follicles, an opinion which is supported by a fact, stated by Dr. Budd in his interesting sketch of cholera\* indica, or that by drawing the coats of the stomach between the finger and the

\* Library of Medicine, vol. iv, p. 114.

thumb, and using some pressure, a white opaque fluid is squeezed out, and the mammellated appearance effaced. In about one half of these cases, Brunner's glands or the duodenal follicles were found enlarged, and also the "plaques de Peyer," the latter being slightly salient and pale or livid, according to the more or less congested state of the mucous membrane.

The liver as well as the gall-bladder has in general been gorged with bile, that fluid being occasionally altered either in consistency or colour. The spleen has frequently been found smaller than usual, while the kidneys have been loaded with blood, and the bladder strongly contracted and empty. The osseous system has likewise been observed to contain more blood than usual.

The substance of the brain and of the cord has presented no change of structure, although the puncta cruenta have been generally increased in number. The membranes of the brain have for the most part been healthy, though often congested, and, in a few cases, points of ecchymosis have been seen.

These are the appearances which the body has presented when the patient has fallen in the first or asphyxiated or pulseless stage, and the phenomena are said to differ in no respect from those observed in persons who have died in the cold stage of intermittent fever, when the blood driven from the periphery, accumulates in the larger, and more central organs of the body. The enlargement of the follicles is supposed to be peculiar to those cases in which diarrhæa or other disorders of the alimentary canal had for some time preceded the fatal attack.

When the patient has survived till re-action has taken place, and the second or febrile stage has been formed, the body has no longer presented that shrunk, worn and livid appearance it did on death taking place in the first stage, but on the contrary, rather the fulness and plumpness of the fever patient. The injection of all the large organs has also disappeared, the blood being recalled to the surface of the body. The alimentary canal, likewise, is no longer distended with the turbid secretion peculiar to cholera,



but contains a thin yellowish purée of fœcal matter having the usual odour. The mucous membrane of the alimentary canal has now, more usually, been found more or less diffusely inflamed, sometimes of every division, but more especially of the pyloric portion of the stomach, and also of the duodenum. The 'plaques de Peyer,' also, though occasionally found enlarged, salient and injected, were but rarely\* ulcerated. Brunner's glands were in a similar state of disease, while the corresponding mesenteric glands were enlarged, sometimes pale, sometimes purplish, and when cut into gave issue to a dark liquid blood.

The lungs have often been seen both congested and in the first stage of pneumonia. The brain has, also, presented the ordinary appearances in fever, or more puncta cruenta than usual with diffuse inflammation of the membranes, and the usual serous effusion into the arachnoid cavity.

*Symptoms.*—Cholera indica has no varieties, but many degrees, and hence most pathologists have divided it into *cholera indica mitior* and into *cholera indica gravior*. The French have termed the slighter forms of the disease cholérine.

The cholera indica may also be divided into two stages, or into the cold, pulseless or asphyxiated stage, and into the hot or febrile stage. This latter stage, however, is not essential to the disease, and has indeed been observed in the Peninsula of India and even in Calcutta, only in a small proportion of the cases. In Europe, however, the febrile paroxysm has followed in the majority of instances.

The duration of the cold stage varies from a few minutes to twelve, twenty-four, forty-eight, or even more hours, while that of the hot stage lasts from four to eight or more days, making the total duration to vary from a few minutes, or a few hours, to two, three or four weeks.

The attack of this fatal epidemic is most commonly sudden, so that the patient at the time of the seizure is apparently in his best health, yet not unfrequently slight diarrhœa or other general indisposition has preceded it. In India, in some cases, the premonitory symptoms were vertigo and noise in the

\* Gendrin, p. 103.

ears, and the latter often so loud as to have been compared to the humming of a thousand swarms of bees, to the beating of all the drums in the camp, or to the roaring of the surf on the Coromandel coast.

The cold stage, whether preceded or not by these symptoms, being formed, the suddenness with which this poison sometimes extinguishes life is extremely remarkable. When the cholera reached Muscat, in some instances,\* only ten minutes elapsed from the first seizure before life was extinct. In one case, a Jew merchant on board the *Conde de Rio Pardo* was in the act of closing a bargain when he suddenly vomited twice, fell down and expired. Many natives at Hoobly were attacked† while walking in the open air, and having retched, complained of vertigo, blindness or deafness, fell down and expired in a few minutes. Mr. Gordon reports to the medical board of Bombay,\* that several cases precisely similar occurred to him ; and one instance is given of a tailor at Bellary who expired with his work in his hand. At Punderpore, also, the disease is said to have raged with such severity, that three hundred and fifty persons died in the streets “tumbling over each other lifeless,” or according to another authority as if “knocked down dead by lightning.” Instances of death taking place in two, three, four, to twenty or more hours, have been common in every country. The more usual course of the disease when limited to the cold stage is as follows.

After the patient has been troubled for a few days with diarrhæa, but more commonly while yet in perfect health or transacting business, or else after having retired to rest and slept soundly till the middle of the night or far onward towards morning, he is suddenly seized with most unaccountable sickness and vomiting together with most profuse discharge from the bowels. These evacuations are attended with severe pains down the thighs, and more especially by an indescribable and subduing feeling of exhaustion, so that the patient has often fainted in the water closet. In an

\* Kennedy, p. 208.

† Ortin, p. 8.

‡ Reports, p. 82.



instant, not only are the physical powers of the body exhausted, but the temperature likewise in malignant cases sinks almost as rapidly below the natural standard, and an icy coldness benumbs the whole surface, so much so, that the skin has often been found insensible to the action of hot water or other powerful chemical agents. The breath, also, has a glacial feel. Still notwithstanding this great depression of temperature, the patient complains of being oppressed with heat, is incessantly throwing off the bed clothes, and no quantity of cold water, though grateful to the palate, and copiously and eagerly drank, affords relief to his insatiable thirst.

The extreme coldness of the first stage is further accompanied by a blue or livid purple discoloration of the hands and feet, extending not only a considerable way up the arms and legs, but sometimes over a great part of the body. The cutis of these parts becomes not merely shrunk, but singularly shrivelled, like the hands of a washerwoman after a day's hard labour. These frightful symptoms are usually rendered more distressing by the shrieks and groans of the poor sufferer tortured by horrible spasms which affect the fingers, the toes, the arms or the legs, which clench the jaw, and even sometimes affect the muscles of the abdomen and the rest of the trunk. The patients think they obtain some relief from friction, and their cries are incessant to their attendants to rub them hard.

As the disease proceeds, the countenance assumes a character peculiar to this great struggle, or the *facies cholericæ*, the eye being deeply sunk, red, and injected, while the aqueous humour transuding its coats, leaves the cornea flat and depressed as in the dead body. A broad and livid band, also, encircles the lower portion of the orbit. Every feature, moreover, is sharp, and pinched as after long disease, the complexion thick and muddy, the lips and tongue purple, and all these great changes have been known to take place in a few minutes.

In the midst of all this great depression, the vomiting is constant, the purging incessant, and the spasms almost

without intermission. The pulse though sometimes natural and sometimes rapid, is, in severe cases, not to be felt even from the first moment of attack either in the larger superficial arteries or at the wrist. The voice, also, is strangely altered, being changed from its firm and manly tone to a feeble unnatural and almost sepulchral sound. The urinary secretion is likewise entirely suppressed, while no bile flows into the intestine. The only organ which seems to preserve its powers is the brain, and the patient, often to the last moment of his life, retains the power of thinking and of expressing his thoughts distinctly, sometimes full of hope, at others desponding, while at others he seems indifferent to the fate which too often inevitably awaits him.

On the accession of the spasms, of the vomiting, and of the purging, the disorder is fully developed, and the crisis is at hand, which in a few hours must decide the fate of the patient. The termination may be favourable or unfavourable. If unfavourable, the patient may die with all the symptoms narrated strongly marked, or else they may abate, and a favourable prognosis may be formed. Unfortunately, however, it too often happens, that although the stomach retains what is taken, and the purging appears checked, and the patient falls into a doze, yet, the weakness, the entire cessation of the pulse, the coldness and lividity of the surface, and the ghastly expression of the countenance, show that a few hours must close the scene, without the slightest re-action. This melancholy result occurred to Gendrin in seventeen out of twenty cases, and often with so little struggle, that death was only marked by the phenomenon of cadaveric contraction.

But, strange to say, death does not always terminate the singular phenomena of the cold stage of this extraordinary disease; for in many instances, after the functions of the brain have ceased, and life is, apparently, departed, the hand has been seen to move, the toes to bend, the jaw to become clenched, the leg to rotate, the muscles of the thigh to quiver; and, in India, instances are given of the body having been drawn into an upright sitting posture, and even to make a round turn on the table on which it has been laid out. These phenomena often last for some hours, and shew that the cord



continues to furnish a supply of nervous power, long after the brain is dead.

If the patient should happily survive the cold stage, the disease may terminate by a rapid recovery, or else may pass into the second, or febrile stage. The former is the usual course in India, the latter in Europe. The first symptoms of returning health, are the patient falling into a sleep of unusual soundness, during which the respiration becomes light and easy, the pulse freer, while a gentle, warm perspiration bedews the whole body. This grateful pause in the disease appears to be the result of the returning powers of life, almost uninfluenced by medicine, for it often occurs when none has been given. After this balmy slumber, the patient awakes refreshed, and often recovers so rapidly, that, in the natives of India, it almost resembles a restoration after syncope,\* colic, or other transitory disorder. In other cases, however, a slight re-action takes place, followed by a rapid convalescence. In all the Presidencies, indeed, and especially in Bengal, the recovery of the European has been very commonly followed by a stage of re-action, generally slight, in some cases assuming the form of the bilious remittent or country fever, and which has occasionally terminated fatally.

In Europe, restoration after the cold stage has been by no means so rapid or so certain as in India. Sleep may, indeed, have ensued, fœcal evacuations containing bile, may have passed, the urine may again have flowed, the purging, vomiting and spasms may have stopped, the pulse may have risen, the blueness have disappeared, and the temperature of the body may have increased, yet the patient, nevertheless, has only slowly recovered ; while, in many instances, the amelioration of the symptoms has only been temporary, and he has relapsed and died.

In thirteen cases out of twenty, the re-action is more considerable, and the patient, in a few hours after the subsidence of the cold stage, labours under a severe form of fever, in no degree dissimilar, and not less fatal than typhus. For the first few hours, the tongue is white, but it quickly becomes

\* Madras Reports, p. 28.

brown and dry, and a black sordes encrusts the teeth and lips. The eye now becomes deeply injected and red, the cheek pale or flushed, the pulse rapid, the temperature of the body a little above or below the natural standard, and the patient, either delirious or comatose, lies in a state resembling the last stage of the severest continued fever of this country. This struggle usually lasts from four to eight days, when the symptoms either gradually yield, or death ensues. In a few mild cases, the fever has assumed an intermittent type, sometimes a quotidian, sometimes a tertian form, and all these cases have usually recovered. Such is a general outline of the symptoms of this formidable disorder, but a more particular analysis of the symptoms cannot be read without interest, and the following extracts are abridged from Mr. Scott's Madras reports and from the appendix to Mr. Kennedy's work.

The *vomiting*, so prominent a symptom, very constantly exists throughout the cold stage. There are, however, numerous instances in which it has been entirely absent. In certain epidemic visitations, scarcely an individual has manifested this symptom. The matters vomited are, first, the contents of the stomach, and, subsequently, except in a few instances, they resemble the fluids passed by dejection. The act of vomiting is, for the most part, without pain, the stomach, as it were, "spouting forth," its contents.

The *purging* is a more constant symptom than the vomiting, and, in the majority of cases, is the first in the order of occurrence. This symptom is often incessant, and only in a few rare instances of great malignity, has it been altogether absent. The dejections are sometimes passed without effort or uneasiness, at others they are thrown out with great effort, like the "squirt from a syringe." There is seldom much griping or tenesmus, although the calls are sudden and irresistible. Pain on pressing the abdomen has been only occasionally noticed. In advanced stages, the purging generally ceases, but, in many of these cases, a flow of watery fluid from the rectum has taken place every time the patient has changed his position. The matters evacuated after the



first emptying of the bowels, have been occasionally greenish or yellowish, turbid or frothy, and having an appearance like yeast. But by far the most common appearance is that of pure serum, so thin and colourless, as not to leave a stain on the patient's linen. The next in order of frequency is the *conjee* like fluid, sometimes so turbid as to appear like milk. These fluids, it has been stated, give sometimes an acid and sometimes an alkaline re-action, and according to Dr. O'Shaughnessy, are composed of water, carbonate of soda, albumen and casein. The reappearance of fœcal matter, especially if tinged with bile, seldom, perhaps never, takes place till the disease has begun to subside.

The vomiting and purging are very generally accompanied by *intense thirst*, and a *burning heat* at the epigastrium, symptoms which are very prominent in cholera. Yet, in some individuals, and also in some epidemic invasions, they have been altogether wanting. Even when they are present in the highest degree, the mouth is not parched, nor the tongue dry. On the contrary, there seems, in general, no want of moisture, and while, as Mr. Jameson observes, "all is burning within," the surfaces are cold, moist, and sometimes blanched. At times, however, the mouth is parched, the tongue dry and furred and the thirst great, a symptom which seems to subdue all other feelings, and the ignorant soldier, as well as the medical man, who firmly believes cold water is almost certain death, alike eagerly drink it.

The *pulse* ceasing to be felt at the wrist, has often occurred at the very onset of the attack, and not unfrequently at the end of three, four, or more hours, and often continues lost throughout the cold stage. This symptom is not necessary to cholera, but the proportionate numbers in which it has been present or absent have not been stated. On the cessation of the spasms and of the vomiting, the pulse may return for a short time, but more commonly only again to cease. If a vein be opened in this pulseless state, the blood does not so much flow as trickle, and this only to a very small amount, perhaps not more than the vessel at the time contains, and which immediately collapsing, no more blood can

be obtained. If the patient dies in the cold stage, it is rare that the circulation has not been arrested at the extremities, at least, some time before death takes place. It is singular how long a man may live in this condition. Dr. Kellat relates a case where the pulse was lost within three hours of the attack, or at 4 p. m. of the 3rd October, yet the man lived till 2 p. m. on the 6th; and other cases are mentioned, in which the patient has been able to walk, and even to perform many of his usual avocations, after the pulse has ceased to be discernible at the wrist. The pulse has, in all cases, returned on the setting in of the hot stage.

The *blood*, in cholera, varies according to the stage, and drawn in the cold stage, is, as has been stated, usually of an unnaturally dark colour and thick consistency, so that it flows with difficulty from the veins, and very imperfectly separates into clot and serum. When the temporal artery has been opened, the blood has been found to be as dark and thick as that from a vein; and the artery, having emptied itself in a languid stream, without the usual jet, has immediately collapsed and the blood has ceased to flow. Chemical analysis has shown this singular state of the blood to be owing to a deficiency in the quantity of serum in proportion to the clot, which, according to some authorities, is reduced to one-half. The fibrine is also said to be diminished in quantity, and the carbonate of soda, usually present in the blood in minute quantities, to be altogether wanting.\* In the blood of those cholera patients in whom the urine has been suppressed, the presence of urea has been detected, and according to Dr. Russel, this substance also exists in the bile under the same circumstances.

“After the fever is established,” says Mr. Hermann, “the serum of the blood increases, till at length it is much more abundant than natural. It is at this period that the secretion of urine is re-established, and becomes more considerable, though less animalized than in health.”

\* According to an analysis by Dr. Clanny, the blood of choleric patients had lost 112 parts of water, 90 of albumen, 12 of fibrine, and 14 of the salts in 1000 parts. The deficiency of the salts is so great as to equal the total amount contained in healthy blood.



In cholera, the *secretion* of urine, like most of the other secretions, is most commonly suspended in the stage of asphyxia; and this, indeed, is so constant, that it has frequently not been noticed in the military reports. But where this secretion has been going on, the circumstance has been particularly mentioned, and in these cases it has always been observed to be small in quantity and limpid.

At the commencement of the period of reaction, the urine was often large in quantity and pale; subsequently it was of a bright yellow, and a day or two later it deposited a red sediment. The patient often died while the urine was yet pale, and, according to Gendrin, the deposit never disappeared during the fever without dangerous cerebral or abdominal symptoms being imminent.

It has been remarked, that the cases in which the urine continues to be secreted during the stage of asphyxia, are not less dangerous than those where that secretion is entirely suspended. It has, also, been observed, that the restoration of this secretion is always a most favourable omen. In many cases, fifty hours have elapsed from the commencement of the attack without any urine having been passed, and it has even been reported, that during a local prevalence of cholera, the secretion of urine has entirely been suppressed in some individuals, without any other symptom of this formidable disease being present. When cholera first appeared, the suppression of urine was so little suspected to depend on the kidney, that frequent attempts were made to relieve the patient by the catheter.

The *temperature* of the surface of the body, in general, undergoes a more marked reduction than in any other disease, and the thermometer, instead of standing at 98°, as in health, has fallen to 84°, 79°, and even to 72°. This diminution of temperature extends even to the blood, for a thermometer introduced into the cephalic vein, has fallen to 88°, 84°, and even to 82°.\* This glacial coldness is supposed, by Dr. Budd, to be owing to a deficient arterialization of the blood, for it has been observed, that in the morbus cœrulus, from

\* Gendrin, p. 43.

malformation of the heart, the temperature is less than natural. Besides being very cold to the feel, the skin is covered with a cold, clammy, and often profuse sweat. Nevertheless, varieties occur in this, as well as in the other symptoms of cholera; for the skin has been observed, though cold, to be sometimes dry and sometimes natural. In some cases it is said to have been preternaturally warm. An increase of temperature has been repeatedly observed to take place just before death, and in all cases where this is confined to the trunk and head, it has been found to be the prelude to a fatal termination.

The sensation imparted to the hand, by a person in the cold stage of cholera, is extremely remarkable, reminding us of that imparted by the dead body. The subcutaneous cellular tissue of the extremities is, also, singularly affected and its elasticity so impaired, that the skin is wrinkled and corrugated, as if the patient had grown "instant old." The skin, moreover, is often so collapsed, as to be insensible to blisters—to the application of the mineral acids, and even to the action of boiling water.

The *respiration* is not usually interrupted in the early stages of cholera, but it generally becomes slower and slower as the disease advances; and in one case the respiratory movement is related to have been only seven times in a minute. Occasionally, however, spasm has attacked the diaphragm and muscles of respiration generally; and numerous instances are given of the patient being so affected in his breath, that it could only be compared to a violent attack of asthma. In almost all cases, however, the chemical action of the lung has been greatly affected: the breath being so cold, that the thermometer, placed under the tongue, has fallen to 87°, the air respired is also deficient in the usual proportion of carbon, and the oxygenation of the blood evidently impaired. The change of voice shows that the muscles of the larynx have fallen equally with the rest of the respiratory system into a state of collapse.

Though *spasm* is generally present, yet no symptom is more generally wanting. It is more frequent in the European than in the native patient, and in the robust and strong, than in the feeble and sickly. In the most dangerous form of



cholera whether in the native or European, spasm is generally wanting, or is present only in a slight degree. This symptom is extremely painful, and occurs at various intervals of time, often from minute to minute. The muscles most commonly affected are those of the toes, feet, and calves of the legs; next to these the corresponding muscles of the upper extremities, then those of the thighs and arms, and lastly, those of the trunk. The reports make frequent mention of a remarkable, permanent contraction of the muscles of the abdomen, by which its walls have been drawn towards the spine. Between the spasms of this disease, and those of tetanus, says Mr. Curtis,\* there is a material difference. In tetanus, the spasms are not attended with much pain; there is no contraction and gathering up of the belly of the muscle into a "hard knot," but rather a fixed rigidity—over-tone and tension. In cholera, however, it is a fixed cramp in the belly of the muscle, which is gathered up into a large knot, with excruciating pain. In a minute or two this relaxes, and is again renewed, or the affection passes to others, leaving the miserable sufferer hardly an interval of ease.† This spasmodic contraction of the muscles is always attended with pain; and in one case, a man paralytic in his limbs with total numbness, it was exquisitely severe. The medical officers have observed, that a spasmodic stiffness has continued for several days afterwards.

A state of *restlessness* and *jactation* is common, but more so in the European than in the native of India. In cases of such sudden and dangerous illness some allowance must be made for the moral as well as physical disquietude of the patient. But while the limbs are incessantly tossed about in every direction, the functions of the brain are seldom dis-

\* Pages 22 and 50.

† Gendrin takes a different view of the phenomena of cramp in cholera, he says: "This cramp consisted in an involuntary and convulsive contraction of a portion of a muscle, sometimes of one part and sometimes of another. All the muscular fibres were thus successively affected. Never was the muscle affected in such a manner as to give a tetanic stiffness to the limb. On feeling a muscle contracted with cramp, it gave the sensation of a hard tumour between two depressions." P. 31.

turbed, and notwithstanding the immense quantities of opium that have been given, delirium has seldom been observed until the second or febrile stage has been established.

*Diagnosis.*—The phenomena of the first stage of cholera indica, are unlike those of any other disease known in this country, and therefore cannot be mistaken. The second or febrile stage is similar to many of the forms of typhus fever, and is not to be distinguished from them except by the previous history. The cholera indica differs from the cholera morbus of Sydenham, in the lividity of the extremities, the suppression of urine, the nature of the evacuations, in the loss of the pulse, and in the greater amount of collapse.

The cholera indica as seen in India, differs also from that in Europe; according to Drs. Barry and Russell, in the evacuations being more profuse and ungovernable, and in the circumstance of the patient being much more frequently convalescent without passing into the febrile stage.

*Prognosis.*—The mortality from cholera has, in all countries, been very great, in proportion to the numbers attacked, and the prognosis is, therefore, in every case, extremely grave. Gendrin states\* that he lost every case in the pulseless stage. The proportion† was 0.653 when the cyanic period was com-

\* P. 60.

†TABLEAU DU NOMBRE DES MALADES ET DES MORTS CHOLÉRIQUES DANS TOUS LES HÔPITAUX CIVILS DE PARIS DU 26 MARS AU 20 JUILLET.

DATES. 1832.	NOMBRE DES MALADES.			NOMBRE DES MORTS.		
	HOMMES	FEMMES	TOTAL	HOMMES	FEMMES	TOTAL
Du 26 Mars au 31 Mars .	131	72	203	64	27	91
Du 1 au 5 Avril . . .	812	538	1,350	403	232	635
Du 6 au 10 Avril . . .	1,463	1,248	2,711	734	612	1,346
Du 11 au 15 Avril . . .	932	1,028	1,960	579	620	1,199
Du 16 au 20 Avril . . .	628	763	1,391	363	386	749
Du 21 au 25 Avril . . .	443	504	947	217	268	485
Du 26 au 30 Avril . . .	266	327	593	111	136	247

From the 30th of April, the number attacked gradually declined to 427, 287, 200, 150, 80, till from the 6th to the 10th of June, it fell to 40. From that period, however, there was again a gradual increase, till the numbers again reached, between the 16th and 20th of July, 547, after which it once more declined and slowly disappeared.



pletely formed, 0.103 when it was as yet incipient, and 0.037 during the previous stage of diarrhæa. This, perhaps, is a fair estimate of the proportionate loss from each class of the disease.

Taking the whole number attacked, it is said, that the proportionate number of deaths, were, in Astrakan, as one to three; in the government of Kortroma, a fraction less; in that of Mishni Novogorod, one-half; in Casan and Moscow, as three to five; and in Penza, the country of the Don Cossacks, as two to three. In the summer of 1831, the mortality at St. Petersburg, Riga, Mittau, Limburg, and Brody, according to the Berlin Gazette, was about one-half, while at Dantzic, Elbing, and Posen, it was about two-thirds of the whole number attacked.

The period of the *season*, however, greatly influences the mortality, and the proportions of deaths to recoveries observed in Moscow, at its various phases, has been nearly that of all Europe. On the first onset nine-tenths of the whole number attacked perished; then seven-eighths, and the proportion of deaths forms a gradually decreasing series of five-sixths, three-fourths, a half, a third, till towards the close of the season, a large proportion of those attacked recover. The uniformity of this law, in every country infected by cholera, whether India, China, Europe or America, is extremely remarkable.

The chances of recovery are, also, much diminished in the aged, and in children, and the age of the greatest number of recoveries is from fifteen to twenty. The feeble in constitution, the sick, and the convalescent were, in all instances, the surest victims of cholera.

It has been remarked, that very few patients recover in whom there is the combination of those symptoms which characterize collapse, as loss of pulse at the wrist, great coldness and lividity of the surface, and suppression of urine.

An increase of temperature has often been observed in the cold stage, immediately before death, about the head and trunk. This partial development of heat is, therefore, a grave, if not a fatal, symptom.

A subsidence of the vomiting and purging, and of the

spasms, is not unfrequent, but unless accompanied by other favourable symptoms, it is the prelude of death.

If the stage of febrile reaction be marked by a train of low typhoid symptoms, as a dry brown tongue, sordes of the mouth, delirium, injected eye, rapid pulse, and a continued suppression of urine, the prognosis is always unfavourable.

The favourable symptoms are a return of the pulse, the return of the natural temperature of the body, the renewal of the secretion of urine, and also of the fœcal evacuations assuming a natural colour and a healthy consistency, together with the tongue continuing white during the stage of reaction. The prognosis is likewise more favourable, when the consecutive fever is of an intermittent rather than of a continued type.

*Treatment.*—There are few diseases for the cure of which so many different remedies and modes of treatment have been employed as in cholera, and unfortunately without our discovering the proper antidote to this poison. In Moscow it is said that twenty different modes of treatment were practised at twenty different hospitals, and that the proportionate number of deaths was the same in all. In the same city, also, it is supposed that the mortality was not greater among those destitute of medical aid, than among those who had every care and attention shown them. It may be fairly inferred, therefore, that in the severer forms of the disease, the action of this poison is so potent, as to render the constitution insensible to the influence of our most powerful remedial agents. When, however, the disease is on the decline, or assumes a milder form, much may be done, by obviating symptoms, to promote the recovery of the patient. A few heroic attempts have been made to strangle this disease, of which bleeding, calomel and opium have been the principle, and the results have been as follows.

As the first stage of cholera is marked by a profound collapse without a trace of altered structure, little might be expected from the practice of bleeding, and yet human ingenuity has given a colourable pretext for this practice in the theory of venous congestion oppressing the great nervous centres and depressing the vital actions. The spasms, also,



were supposed to have been of a tonic character. The practice has, therefore, been extensively adopted. In India, those who contend for its use have determined that not less than thirty ounces will ensure success, which shows that the parties must have been bled before the disease was fully formed, and consequently problematical. On the contrary, the great majority of practitioners condemn it altogether, affirming that fatal collapse has followed not only these large bleedings, but even much smaller ones, and this where the disease has been mild, while, in dangerous cases, the circulation in the superficial vessels being altogether arrested, not more than a few drops of tarry blood can be obtained. Dr. Martin seems to think the character of the disease changed in India, “for latterly there seems a depression of the vital actions, which has greatly embarrassed our treatment, and deprived us altogether of the former great resource—blood-letting;”<sup>\*</sup> and again† “we have been obliged latterly to abandon (it) as deadly.” In Europe, on the breaking out of the cholera at Astrakan, the supreme medical board at St. Petersburg recommended the treatment of the medical practitioners of India should be adopted at Orenberg; consequently, the patients were extensively bled, but with so little success that Dr. Sokolow says, the most hurtful of all predisposing causes was bleeding, and that it was painful to point out the losses occasioned by this unseasonable remedy.‡ Professor Lichtendstadt§ also, says “several reports transmitted from Moscow, make it to be feared blood-letting, which was so much tried at Orenburg, has furnished at Moscow a very unfavourable result, since few speak of its employment.” In Poland, also, it is stated that the Russian physicians renounced the method originally followed by the English physicians, or that by copious blood-letting, and large doses of mercury, and placed more confidence in opium and mucilaginous drinks.|| Brierre de Boismont. also, states that the Polish physicians adopted the English method, or by bleeding and calomel, and that for a time it was suc-

<sup>\*</sup> Medico Chir. Review, January 1841, p. 103.

† P. 105.

‡ Supplement to Edinburgh Medical and Surgical Journal, p. 22.

§ P. 96.

|| P. 92.

cessful; but was at length restricted to the robust and strong, and, that after the battle of Ostrolenka, it suddenly lost all efficacy. It will be unnecessary to adduce further evidence of the inefficiency of bleeding, when it is remembered that 7,000,000 of persons are estimated to have died in the east before that disease reached Russia, and that in all countries, on the first onset, nine-tenths of the cases have terminated fatally. It has been imagined that bleeding, if contra-indicated in the cold stage, is serviceable in the hot stage. It is remarkable, however, in this country how badly the patients bore bleeding, even in this stage, from the great tendency the disease showed to become typhoid. The utmost, therefore, that can be said of this practice after the fever is established, is that leeches to the head occasionally afforded relief.

The next means which have been extensively employed for the *cure* of cholera is mercury in all its variety of forms. Among them calomel has, perhaps, been the most used, and often in immense quantities, either alone or combined with opium. The views that have governed its exhibition are very various. Some have given it to quiet the irritation of the stomach—others to emulge the biliary ducts—others as a powerful means of subduing a supposed existing state of inflammation; while others have employed it as a possible antidote to the poison. Unhappily, however, the practical results are in no degree in accordance with these theories. As to the supposed property of calomel in quieting the stomach in this disease, there is abundant evidence that it does not possess it, and, moreover, it is generally admitted that vomiting, or mere irritability of the stomach, is a more favourable symptom than its entire absence. An extensive experience has also shown that calomel has so little power in restoring the flow of bile into the intestines, and of emulging the biliary ducts, that many considerable authorities have recommended its exhibition should be delayed till the violence of the symptoms has passed. As an agent, also, for subduing inflammation in the cold stage, it can be of no use, for no such state of parts exists, and what is remarkable, it



has been observed in India, that in stomachs otherwise healthy, the portions of the mucous coat which have been covered with the calomel taken, are the only parts which have presented any redness or discolouration. It is only, therefore, as a possible antidote to the poison that calomel deserves any consideration. But notwithstanding a most liberal use of it, the immense mortality that has occurred in every country is entirely conclusive of the question. In India the usual dose is a scruple, together with one hundred drops of *Ræ opii* in a glass of brandy and water, given on the first sickness and repeated at short intervals. This was the prescription used in the grand army under the Marquis of Hastings, but with so little success that bleeding was at length substituted. Dr. Kennedy\* and Mr. Scott† have both seen many patients under the full influence of mercury, attacked, and the first cases of cholera seen at St. Thomas's Hospital were in the foul wards. Calomel may be said to have been used to the greater part of an ounce in the twenty-four hours without favourably influencing the disease, and this is beyond what, under ordinary circumstances, is consistent with the safety of human life.

The failure of bleeding and of calomel has led to a most extensive use of opium and of its salts, first with a view of calming the gastric and intestinal irritation, and also of affording some relief from the severe suffering caused by the cramps or spasms, and this medicine has been used separately or conjointly with the above modes of treatment. In India, the usual dose is from two to four grains of the solid extract, or its equivalent eighty to one hundred drops of the *Ræ opii*, repeated at short intervals, and these doses have been increased till they have amounted to two and even three drachms of the *Ræ opii*, and to corresponding quantities in a solid form. It is painful to be obliged to acknowledge that as a cure for cholera, opium has entirely failed, and even that its power of alleviating in any degree the symptoms of the disease is questioned. Some have characterized it as wholly inert and even deleterious. Perhaps, the opinion of Mr. Scott is nearest the truth;‡ or that it is by no means a specific in cholera, but an

\* P. 235.

† Madras Reports, p. 37.

‡ P. 46.

auxiliary of the first importance, never to be omitted in the earlier stages, and should precede the use of every other remedy unless given in conjunction with it.

On the appearance of cholera in Europe, opium was administered in the doses recommended by the Indian practitioners, but it was quickly found that in the cold stage, the constitution was armed against its usual narcotic effects, and that it was equally inefficient in controlling the vomiting or purging, or in relieving the spasm. The powers of opium, however, though suspended during the cold stage, were often fully developed in the hot stage, and occasioned so much affection of the head that most practitioners either abandoned its use, or else limited the dose to a mere fractional part of that exhibited in India, or from *mijj* to *xij*. The mortality from the antagonist systems of bleeding and of opium, as far as can be ascertained, is, perhaps, nearly equal.

These great and powerful remedies having failed, or shown little power over the disease, the great class of stimulants has been had recourse to, in order to counteract the fatal tendency to collapse. And æther, ammonia, camphor, musk, castor, the essential oils, ardent spirits, wine, mustard, *Cajaputa* oil, and an endless number of medicines having similar properties have been exhibited in all countries. But the utmost that can be affirmed of them, is that they have been occasionally useful.

Another class of substances which has obtained much reputation in this country is the neutral salts, and the theory upon which they have been administered is, that as the quantity of serum circulating in the blood of cholera patients is diminished in proportion to the clot, so the quantity of saline particles of the blood must also be diminished—a deficiency which has been asserted to be the cause of cholera, or, at least, to demand the exhibition of alkalies in the treatment. The want of success in the experiment, however, appears to be fatal to the theory ; for when exhibited by the mouth, says Mr. Scott,\* “ many instances are noted in India, “ where cholera has supervened on the use of neutral purging salts.” In the island of Mauritius, the French freely used the



sulphate of magnesia in two drachm doses, but, in one report, it is stated that 194 persons died out of 440, and in another, that 94 out of 133 perished. When the fourth and sixth regiments halted at Tackmetta,\* the camp was a scene of confusion and lamentation for the cholera had broken out. The remedy employed on this occasion was milk and magnesia, "but not a man was cured by it." Dr. Martin also says, "many cases have occurred within my recollection of the "disease being thus insinuated, and mistaken for the action of "salts, until the speedy approach of the stage of collapse "made the real nature of the case but too apparent."

At Orenberg, also, so far from neutral salts being found serviceable, Dr. Sokolow observes that the injudicious use of cathartics, especially of *neutral salts*, was very injurious.† The muriate of soda was given in half ounce doses in almost all parts of the continent, and was one of the earliest remedies employed in this country, but failed. So buoyant, however, is the mind in carrying out theory, that, although neutral salts had failed when exhibited by the mouth, it was at length determined to inject them into the veins. The case of hydrophobia treated by Majendie, was, perhaps, the basis on which the hope was founded, and Dr. O'Shaughnessey has the merit of having first proposed this operation in cholera. The plan was extensively tried, and more especially by Dr. Mackintosh in Edinburgh. This latter physician employed a solution of  $\frac{3}{4}$ s. of muriate of soda, of  $\frac{1}{4}$ iv. of sesqui-carbonate of soda in ten pints of water of a temperature varying from 105° to 120° Fahrenheit: this solution was injected slowly, half an hour being spent in the gradual introduction of the ten pints. The immediate effects of this treatment were very striking. After the introduction of a few ounces, the pulse, which had ceased to be felt at the wrist, became perceptible, and the heat of the body returned. By the time three or four pints had been injected, the pulse was good—the cramps had ceased—the body that could not be heated had become warm, and, instead of a cold exudation of the surface, there was a genial moisture—the voice before hoarse and almost extinct was now

\*Kennedy on the cholera, p. 195. † Edinburgh Med. and Surg. Jour. p. 22.

natural—the hollowness of the eye—the shrunken state of the features—the leaden hue of the face and of the body had disappeared—the expression had become animated—the mind cheerful—the restlessness and uneasy feelings had vanished—the vertigo and noises in the ears—the sense of oppression at the præcordia, had given way to comfortable feelings—the thirst, however urgent before the operation, had ceased, and the secretion of urine was restored, though by no means constantly so. But these promising appearances were not lasting: the discharges continued, the evacuations became even more profuse, and the patient soon relapsed into his former state, from which he might again be roused by a repetition of the injection, but the amendment was transient, and the fatal period not long deferred. Of 156 patients treated at Drummond Street Hospital (of which Dr. M. was physician), only twenty-five recovered—a lamentably small proportion. It is proper, however, to add, that this method was adopted only in cases considered hopeless. The result of this treatment, says Dr. Budd, proves that the loss of the serous part of the blood does not constitute the disease. After the failure of all the heroic modes of administering saline medicines, it is difficult to understand the value of Dr. Stevens' celebrated remedy of *sodæ sub carbonatis* 3 s. *sodæ muriatis* ℥j, *potassæ chloridi* gr. vij, dissolved in half a tumbler of water, and to be repeated every half hour. This prescription was tried in several cases in St. Thomas's Hospital, but they all proved fatal.

Having thus stated the great want of success which has attended the most popular remedies, it is hardly necessary to add, that there is scarcely a substance known to the pharmacopœia at any time, that was not tried. Every metal, from arsenic to platina, was exhibited; also, the mineral acids, the various alkalies, phosphorus, strychnine, quina, kino, hæmatoxylum, and every known vegetable astringent, hydrocyanic acid, likewise the entire class of narcotics, and when these failed, the patient has been made to respire oxygen or nitrous oxyde gas; and with a view of imparting new powers to the sinking frame, transfusion of blood has not unfrequently



been practised, but all these methods were equally unsuccessful.

Every heroic remedy having failed, the treatment of cholera, in the judgment of most practitioners, resolves itself almost entirely into obviating symptoms—to checking the vomiting and purging, to relieving the spasms, to endeavouring, to impart warmth, and as far as possible, in the cold stage, to support the waning powers of life. Also, after the hot stage has formed, to treat the disease as nearly similar to typhus fever as possible; and, by limiting himself to these objects, the physician has often been enabled to save the life of his patient.

The first indication is to check the diarrhæa, which so frequently precedes cholera, and lays the foundation of the future attack. For this purpose, opium or morphia, either alone or combined with stimulants, as the *confectio opiata*, or the *pulvis cretæ compositus cum opio*, are often sufficient. In more obstinate cases, some vegetable astringent may be added, as the *Ræ kino*, or the *decoctum hæmatoxyli*, and these remedies have frequently prevented the attack altogether. If, however, the disease proceeds and the cold stage is formed, the same medicines are to be exhibited, and, perhaps, out of an effervescing draught, and according to European experience, in moderate doses and at short intervals.

The next object to be attained, is to shorten the cold stage, by attempting to create some warmth of the surface, and to re-animate the deadly cold body, and also to relieve the spasms. For this purpose, hot bottles should be assiduously applied to every part of the body, or else bags of heated sand or salt, and, in addition to these, the patient should be wrapped in hot blankets. In India, every native house affords a couch, with rattan or corded bottoms, and also chatties, or small vessels filled with burning charcoal, so that any desirable degree of heat may be obtained, by placing those vessels underneath the couch on which the patient is laid—a method often employed, and while being prepared or pursued, the parts affected with spasm have been hardly and roughly rubbed as a means of giving the poor sufferer great relief.

The other methods which have been proposed for recalling heat to the surface are almost endless. At first the warm bath was used, either alone or medicated with mustard, common salt, aromatic herbs, or alcohol. The application of the warm bath, however, has always been difficult, from the continuance of the vomiting and purging, and from the sensation of oppressive heat, which always distresses the patient, in the midst of his glacial coldness, and has caused this practice to be very generally abandoned in this country. Mr. Dalton attempted to substitute the spirit vapour bath, which rapidly produces a powerful heat; still heat, thus applied, was generally without benefit, and greatly disappointed the hopes it had raised.

It has been attempted, also, to restore the temperature by friction, either with hot flannels, the flesh brush, or the hand, and also by rubbing the body with some stimulant and even acrid embrocation, compounded of garlic, capsicum, camphor, cantharides, or other powerful irritant. But, in general, these were superseded by mustard cataplasms, as combining irritation and heat together. By other practitioners, blisters, either with or without an addition of oil of turpentine, were applied after the part had been previously rubbed with hot sand; and when the case has been greatly urgent, the mineral acids, and even boiling water have been extensively employed, for the purpose of producing instant vesication. Another class of agents has also been tried to stimulate the exhausted powers of life, as galvanism, acupuncture of the heart, issues, setons, moxas, and, lastly, small pieces of linen, dipped in alcohol, distributed over the back and the abdomen, and set fire to. Actual cautery, also, along the course of the spine has been applied.

If the moderate exhibition of opium, or of morphine, with aromatics, ammonia, and perhaps brandy, together with the application of heat and friction, have been successful in producing re-action, the second, or febrile stage, may form. It is at this period, according to the opinion of many authorities, that calomel should be exhibited in moderate doses, for the purpose of producing a flow of bile into the intestines, and of emulging the gall bladder and ducts, as well as of res-



toring the rest of the suppressed secretions. The other indications now, are those of a similar state of typhus, namely, to moderate the affection of the bowels, by mild opiates and enemata, by sinapisms to the abdomen, and by relieving the head by leeches and cold lotions, and, subsequently, as the tongue becomes brown, by supporting the patient with wine, sago, strong broths, and a generally cordial treatment. Thus much is in our power, but, in severe cases, art and medicine are alike baffled. In the cold stage, the vomiting may be controlled, the purging may abate, and the spasms subside, but, though these symptoms are removed, the action of the poison is not often suspended, and the patient, with a pulse a few hours before his death, not more than 80, often suddenly dies, "o'er master'd," by the deadly agent under which he labours. In the hot stage, the re-action is often incomplete, and the warmth only partially returns; or, other symptoms being favourable, the lungs are unable to free themselves from the congestion of the cold stage, and blood is expectorated in large quantities, while bleeding, apparently the only remedy, aggravates the symptoms, and hurries the patient the more rapidly to his grave.

*Dietetic and preventative treatment.*—It is plain, from the universal derangement of the digestive organs, that mucilaginous drinks, sago, arrow-root, light broths, can alone be proper during the cold stage; and these may be given alone, or combined with brandy or other stimulants. The patient often experiences, in this stage, a morbid sensation of hunger, but the incessant vomiting renders futile all attempts to indulge it. He often has a like craving for cold, and even iced drinks, and no inconvenience has resulted, even when he has freely drunk of them. In the second stage, the diet should be similar to that of typhus, or a milk diet, with strong broths, but wine is seldom beneficial, or only useful in small quantities.

The preventative rules teach us to avoid every thing that can occasion indigestion; for in every country there are numerous instances of cholera having immediately followed, after eating ascendent fruits, or uncooked vegetables. In Calcutta, eating of the shell and table fishes of the Ganges,

has led to the same consequences. Every act of intemperance and debauchery has been equally fatal; while avoidance of the great heats of the day, and of the air at night are axioms in India. The greater question, however, which a consideration of the preventative treatment involves, is whether the cholera is or is not *contagious*, and, consequently, whether any precaution is necessary in our intercourse with the sick.

The great argument which is urged in favour of the contagious nature of cholera is, that originating in India, it has spread east and west, extending along the high roads, and the banks of rivers, from city to city, and, that in a very few instances, the medical, and other attendants, have suffered in a larger proportion than the community generally; and, consequently, it is inferred, that the disease is propagated by miasmata, generated by the patient's person. On the contrary, it is contended, that the cholera still rages in India, with its fullest force, and yet does not spread. Again, that the progress of cholera has been, in no degree, dissimilar to that of other epidemic diseases, not generally considered to be contagious; also, when a disease is prevalent over the country generally, it is impossible, in all cases, to distinguish attacks which are accidental, from those which are the result of endemic influence, and that in every epidemic, certain portions of the population suffer more than others; and, lastly, that the instances of the medical and other attendants of hospitals, or of other great centres of the disease, not suffering in a greater proportion than the rest of the population, are numerous, and far outweigh the few cases which may be adduced to the contrary. It will only be necessary to add a few examples of the immunity of the attendants, generally, on the sick, to place this argument in its full light.

Mr. Jameson states, that the general voice of the inhabitants at large, in India, is uniform against the disease being contagious, or conveyed from person to person. He adds, also, that of two hundred-and-fifty officers, comprising the medical staff in Bengal, all but one are non-contagionists; and that out of the whole list, only three of those gentlemen



were known to have been attacked with cholera, during the three years it most severely raged, or from 1817 to 1820. Mr. Twining, also, first assistant surgeon to the general hospital at Calcutta, says, "The persons most exposed to contract cholera in the general hospital at Calcutta, (if the disease were contagious), are those having the charge of the bedding and clothing, and those employed as personal attendants on the patients, but not one of the subordinate washerwomen, or people employed about the clothing and bedding stores, has ever had the cholera. The native dressers have daily the most unreserved communication with the sick, changing the applications over leech bites, and the bandages to the arms of such as are bled, dressing blisters and applying sinapisms, yet not one of these men has ever suffered from the disease. The sunpers, who clean and change the close stools, as well as the pans in which the matter vomited is received, and who wash those patients who are helpless, have never been known to suffer from cholera. The coolies, also, are employed to rub and shampoo the extremities of the cholera patients, and often cannot avoid inhaling their breath, as well as the exhalations from the bodies of patients in the most deplorable state of the disease, yet, not one of these men ever suffered from an attack of cholera. The young Asiatics, also, studying for native doctors have equally escaped. Having," he adds, "already stated the entire exemption from cholera, of those persons employed in the general hospital, who were most exposed to unreserved and constant communication with the sick, I am desirous to mention, that when the epidemic cholera has prevailed at Calcutta, we have had sick and convalescents attacked in the hospitals; but it has generally happened, that those attacked in this manner have been in parts of the hospital remote from cholera patients, very often in a different building, and precluded from any direct communication with those who are brought in with cholera."

In the Madras reports it has, in like manner, been observed, that the numerous hospital attendants of that Presidency, as also the sick in the hospital of other diseases,

though mixed with cholera patients, did not suffer in any considerable degree. Mr. Annesley,\* who had long charge of the general hospital at Madras, says : “ I never saw more than  
 “ five or six persons, while patients in the hospital, at-  
 “ tacked with epidemic cholera, although I have had thirty  
 “ or forty cases of the disease at the hospital at one time,  
 “ when it contained not fewer than from one hundred to two  
 “ hundred-and-seventy patients.” Mr. Orton, also, says,†  
 “ that in a vast number of instances, in India, the attendants  
 “ suffered no more from their employment, than if they had  
 “ attended on so many wounded men.”—At Bangalore,  
 “ it was customary,” says Dr. Moreat,‡ “ when a man was  
 “ deemed dangerously ill, or required particular care and  
 “ attendance, to have two of his comrades from the barracks  
 “ to attend him in hospital, and these were regularly relieved.  
 “ Thus, sixteen men, who were dangerously ill from cholera,  
 “ and for whom fifty-seven attendants were procured, and  
 “ who were constantly employed in rubbing them to ease the  
 “ cramps, or in giving them medicines, and, in fact, in per-  
 “ forming all the offices and duties of nurses, and even, at  
 “ times, were seen sleeping along side their beds, yet only  
 “ four of these fifty seven so employed were attacked,  
 “ and none died, which makes one in sixteen, nearly, attacked ;  
 “ whereas two hundred and two of the whole regiment were  
 “ attacked, making the proportion of seizures as one to three  
 “ one fifth.” On the Bombay side, also, all the reports cor-  
 roborate the general exemption of the medical officers and  
 attendants on the sick. Thus Dr. Taylor affirms, of forty-  
 four assistants, employed under him, only three were seized  
 with the cholera.

In military life the breaking out of the cholera among the  
 Turks immediately after their defeat by the Persian army  
 infected with the disease, and also of its breaking out among  
 the Poles immediately after the battle of Inganie, the Rus-  
 sians being infected, are strong instances of the probabi-

\* P. 214

† P. 316.

‡ Med. Phys. Trans., Calcutta, vol. vii., p. 331.



lity of the contagious nature of the disease. But the history of cholera abounds with instances in which a healthy body of troops has joined corps among whom cholera was raging in a fatal form, or else of detachments in which the disease existed having joined a healthy encampment, and yet the disease has not been in either case communicated. A body of Holkars reformed cavalry, five hundred strong, was posted at Mahidpore adjoining the camp of above 2000 Bengal troops and followers, among whom the epidemic was prevailing, and the cavalry did not suffer from the disease, although a cholera patient from the Bengal division was brought into their camp and went through the disease among them. In like manner, Casemates regiment of irregular horse being healthy, joined the Hansi division of the army without contracting the disease at the time the cholera was at its height among the troops that formed it. Again on the 11th of May 1818, a company of Bengal troops, ninety in number, encamped on the bank of a small lake sheltered by a few trees, and surrounded by low woody hills. The detachment arrived at this place in perfect health, but was attacked by cholera at midnight, and before sun rise next morning twenty men were ill of that disease. These men were removed in carts and by doolies to the larger camp in the course of the day, but five men had died and two were moribund before they arrived there. By the end of the week every man of this detachment had gone to the hospital ill with cholera, purging or other modification of the disease, so that there could be no doubt of the malignity of the malady. The men of this detachment had unrestricted intercourse with the troops in camp, yet not one of these individuals was attacked with cholera.\* “More than a hundred such instances,” says Mr. Twining, “may be easily collected.” It was remarked, also, in the Marquis of Hastings’ camp that neither the immense number of hospital attendants, nor bearers of the sick, nor soldiers visiting their dying companions, nor sick in hospital, except convales-

\* Bengal Reports, pages 133, 134, 137.

cents, were attacked in a greater proportion than those who had no intercourse with the sick.

It has been thought that the disease though not contagious in India where the Hindoos live "*sub dio*," and are by religion cleanly to excess, might still be contagious in Europe where it acquired the new property of a febrile stage, and where the habits of the people are entirely different from those of the natives of India. But the evidence of the non-contagious nature of cholera is as positive in Europe as in India. When the cholera first appeared at Orenberg, Dr. Smirnow states, "that his hospital attendants were "twenty-seven in number, that they were constantly employed during the two months the disease lasted in offices "which brought them into the closest contact with the "sick, yet these persons, as, also, the physicians, and the "various other officers of the hospital all escaped." Albers states, "that when the cholera first reached Moscow, all the "physicians were persuaded of its contagious nature, but "experience induced an entirely opposite opinion." Dr. Lefèvre likewise states, "that at St. Petersburg, as far as "regards the attendants of the sick, in no instance have "I known them affected with the disease." Dr. Gibbs of the naval hospital of that city adds, "I have every reason to "think, with other medical men of my acquaintance, that it "is an epidemic, and not contagious."\*

Drs. Russell and Barry, in their communications to government, state that there were instances in St. Petersburg in which the medical officers suffered in a much larger proportion than the rest of the population; but the latter gentleman, adds, that at St. Petersburg twenty-five physicians held a consultation whether cholera was or was not contagious, when twenty-one declared it to be non-contagious. Chamber of the Warsaw commission, who conceives that cholera had prevailed sporadically for weeks before it broke out at Warsaw after the great battle says, that of nearly one hundred physicians, English and German, about the sick

\* Edinburgh Med. and Surg. Journ.



in Warsaw, that none suffered from cholera.\* Brierre de Boismont adds, that in Poland, in order to prove still further its non-contagious nature, “I have touched hundreds of cholera patients, I have inspired their breath, and cut myself in dissecting them. Gallois has opened a considerable number of cholera patients, and he, likewise, cut himself. Dr. Jännichen, of Dresden, Foy, Pinel, and Verat, of Paris, have inoculated themselves with the blood of an infected patient, and have tasted the matters vomited, and yet none have suffered any inconvenience.” Dr. Baum, also, physician to the town hospital at Dantzic, says, “the disease made its appearance in that city without any communication with an infected place, and that five physicians were in favour of its contagious property, and twenty against that opinion.”

The number of practitioners in Paris is estimated at 1800. These were constantly and daily in contact with the cholera patients either in the hospitals or in the city, yet not more than twenty-five or thirty laboured under this disease, and of these not more than fifteen or sixteen died.† Although the wards of the Hôtel-Dieu, assigned for the reception of the cholera patients were filled, still no case was proved to have occurred from infection among the twelve physicians, the hundred pupils, or the many hundreds of medical men that came from all quarters to see the disease. The nuns, also, and the nurses escaped, with only an inconsiderable mortality.‡

With respect to the origin of the pestilence in England, doubt is thrown upon its being imported by the first authority in the state, and also by a member of parliament high in office. For Mr. Poulett Thompson,§ says, “the doubt which existed fully justified the declaration in the King’s speech, that it was not known whether the disease was imported from abroad or had sprung up in this country. From the most minute observation which it had been possible to make, it appeared that every person who was on board the

\* Med. Gaz. Oct. 29.

† Gendrin, p. 298

‡ Idem. p. 302.

§ Evening Mail, Dec. 14.

“(suspected) vessels, when they left Hamburgh, was, on arriving at Sunderland, and remained up to the time of the last accounts, in perfect health.” In whatever manner, however, cholera broke out in England, the general opinion of the profession with respect to its contagious nature corresponds with that of the medical officers in India, and on the European continent, for the attendants on the sick did not suffer in a greater degree than the rest of the population. “In Newcastle, Sunderland, or Gateshead, says Mr. Molison, not a single medical man was affected. The same remark applies to the very numerous medical visitors whom this disease had drawn into the towns. All classes of medical men have fearlessly exposed themselves, and have added as predisposing causes, bodily fatigue, long want of sleep, and great mental anxiety. Some have passed entire nights in the cholera hospitals, others whole days, several have used the stethoscope, many have applied their ear to the patients’ naked chests, and necessarily inhaled their breath and the exhalations of their bodies with perfect impunity. Of the nurses and other attendants, only two have had the disease, of whom one died. Both cases occurred in Sunderland, and as the nurse who died was one of the earliest seizures, it is highly probable she caught the disease in her own home, and not in the hospital. This remarkable immunity of the nurses strongly confirms the statement, that the disease is not actively contagious, because they sleep, as I have daily seen them do in the Sandgate cholera hospital, in the same room, and in the next bed to four or five cholera patients.”

The experience of Mr. Molison is that of the profession generally, who certainly did not suffer in a greater proportion than the rest of the district in which they practised, neither did the nurses, though often covered with the matters ejected both by vomiting and purging during the disgusting offices they had to perform. Perhaps there are few instances more striking than that which the experience of the late Dr. Mackintosh afforded as physician to the Drummond Street cholera hospital. In that hospital “there were 280 bodies examined; two, and sometimes three hours were



“spent in examining each body. The room where these examinations were conducted was a miserable place, eight feet square, generally six or eight persons were present, sometimes more; and in an inner apartment, about ten feet square, there generally lay six dead bodies. Not one of those who frequented this den of death, who had their hands imbrued in the secretions of the dead for six hours out of the twenty-four, were affected with cholera, although their hands were irritated and punctured daily.”\* Dr. Budd also states, that “when the disease appeared in London in 1832, H. M. S. *Dover* was fitted up as a cholera hospital for seamen, and stationed in the river where the disease was most prevalent, more than two hundred sailors affected with it were admitted there; three nurses, and one of the medical men lived on board, the other medical men, four in number, were in daily attendance. Yet of these persons, medical men and nurses, not one was attacked, although the former were engaged almost daily in examining the bodies of those who had died of the disease, and that in the lowest part of the ship, in an ill-ventilated cabin, in which all the dead bodies were placed. When the disease again showed itself in the metropolis in 1834, the medical men and nurses of the hospital ship *Echo*, which was appropriated for the same purpose, enjoyed a like immunity. And, in fact, from the first appearance of malignant cholera in this country to the present time, not one of the medical attendants of the *Dreadnought*, the hospital for seamen in the port of London, or of the cholera hospitals connected with it, have taken the disease.” In St. Thomas’s Hospital, although patients labouring under cholera were not admitted, still it often broke out in the wards, but did not show any tendency to spread, for when more than one ward was infected, it usually attacked not that which was the most contiguous, but those which were most remote; and it seldom happened that two patients were attacked in the same ward at the same time. Two of the sisters

\* Practice of Physic, p. 345.

died of the disease, but there was no case of cholera under their care at the time.

On the return of the stream of cholera eastward, the same opinion of the non-contagious nature of cholera was entertained at Gibraltar. "The medical officers," says Major Tulloch,\* "seem to have been almost unanimous in their opinion that the disease was not contagious. In the same ward with cholera patients in the civil hospital, were several persons labouring under other diseases, who, although in constant communication with, and frequently in attendance on, those suffering under the epidemic, were in no instance affected by it. In the military hospital, too, it was observed that the orderlies employed in attendance on the sick were not attacked in a greater proportion than others who were not so employed. A medical officer of one of the corps furnishes the following specific information on this head: out of two hundred and nineteen orderlies employed about the cholera patients, forty-seven took the disease, while of five hundred and two persons of the same corps, and not so employed, one hundred and four were attacked, giving of the orderlies a proportion of one in four and seven-tenths, and of those not so employed one in four and eight-tenths nearly. It may be stated, that of thirty medical officers in constant attendance on the sick during the prevalence of the epidemic, all of whom, from the nature of their duties, were subject to great fatigue and anxiety, only one or two exhibited any symptom of the disease, and then the cases were comparatively slight."

These facts necessarily force the conclusion, that the most intimate intercourse with the sick in India, or in Europe, has not in general been productive of more infection than was the average lot of the community of the district in which the disease has prevailed. If, also, we, for a moment, consider cholera to be as contagious as typhus, which it certainly is not, still typhus in its most virulent form and such as is seen in armies, although it infects all the communications, does

\* Statistical Account, &c., p. 14 a.



not seem capable of being diffused generally over the country, at least, such was not the case in the Peninsular and other recent continental wars; and if to this consideration we add, that cholera still rages in India—with which there is a more constant and *rapid* intercourse than at any former period—yet has died away in every other country it seems incontestably proved, that cholera is an EPIDEMIC and not a contagious disease.

It will be only necessary now to add, that every preventive means, founded on the principle of contagion, has totally failed. In Moscow many persons provided themselves with a stock of provisions, ‘shut up,’ lived in chambers filled with chlorine gas, yet were seized with the disease. Respecting cordons and quarantine regulations, Russia tried them amply, and in vain. In Austria, the cordons round Vienna “nearly occasioned a civil war.” The King of Prussia, in a proclamation dated Charlottenburg, Sept. 6, complains, “that the Asiatic cholera had penetrated into his dominions, in spite of measures the most vigorous, precautions the most active, and vigilance the most sustained;” and he adds, “the vigorous measures of isolation by cordons, established on the frontiers and in the interior of the country, have hitherto acted unfavourably on the industrious habits of my people, and threaten, if they be maintained much longer, to destroy the comforts of families; and in short, to become more ruinous than the malady itself.” The experience at Naples was equally unfortunate. It is remarkable that Hanover, which early abandoned, or did not adopt this system of quarantine, almost entirely escaped the disease.

## INFLUENZA.

THE poison of influenza produces a slight fever, but its more specific actions are on the ocular, nasal, faucial, and bronchial mucous membranes, causing coryza, bronchitis, and angina. The tertiary action of the poison is on the substance of the lungs, causing pneumonia. The duration of this disease is from three or four days, to a fortnight or three weeks.





## OF THE POISON OF INFLUENZA.

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CATARRHAL affections were known to Hippocrates, who speaks of them not only in his aphorisms, but also in his prognostics, as well as in other parts of his works. But although the ancients were acquainted with this class of disease, they considered it as having merely a local origin, as being endemic in different towns and districts of Greece or of Italy only, and as being caused solely by vicissitudes of the weather. Towards the close of the twelfth and thirteenth centuries, however, it was observed that catarrh was not only endemic in particular districts, but that it occasionally spread over large portions of country. Still later it was found to prevail epidemically, not only over the whole of Europe, but even over the whole of the northern hemisphere, often beginning in Asia and terminating in America, and accompanied with such marked peculiarities in its course, and with so regular a series of phenomena in its symptoms, as distinctly to place this disease among the class of morbid poisons. Of those who first contributed to illustrate this interesting subject, is the historian Du Thou, who speaks of the epidemic catarrh of 1510 as “*morbis novus in Italiâ, dictus Vervicinus qui in oriente primum dien Italiâ, Hispaniâque lethalis;*” he states, also, that Anna, wife of Philip the First, died, and that the life of Pope Gregory the Thirteenth was endangered by this epidemic. Sennert even affirms, that its spread was still more extensive, that it “*fere mundi regiones debachata.*”

In the sixteenth century a still wider spread of this disease was observed; for in 1557, according to Fonseca, an epidemic catarrh originating in Asia spread over all Europe, and, at length, crossing the Atlantic, infected America. The extent to which this disease prevailed in Europe may be seen by the many different names it received. Thus, in France, it was called\* *catarrhe febrile, fièvre catarrheuse ou suffocative*

\* Sennert, lib iv, c. v.



and *cephalée contagieuse*; in England, *epidemic cough*; in Germany, *den Ziep, den Schaffhusten, die Schaffkrankheit, der Hühner wehen*; and by the Italians, *mal del castrone*. This multitudinous nomenclature caused Salius Diversus to say, that however various its names, the disease presented the same symptoms in every country, or fever severe in some cases and slight in others, pain in the head, coryza, severe cough, and great debility both of the limbs and body. This author, also, states it was fatal to the aged, to the valetudinarian, and to those who lived irregular lives; and that it spared neither age, sex, nor condition. It first broke out about the end of autumn, and spreading from country to country, continued to prevail during the winter, the spring, and the summer, when it disappeared; so that it raged equally in cold and in hot weather, in a dry as well as in a moist atmosphere, and in the elevated and mountainous districts as well as in the low and marshy plains.

The seventeenth century was fertile in many partial endemic catarrhs, both in this country and on the continent, and also in several epidemic catarrhs of wide and extensive spread. The eighteenth century presents, however, a still greater number, and recorded by some of the most celebrated physicians of modern times, as Lancisi, Hoffmann, Sauvages, Huxham, Morgagni, and Sir George Baker. The epidemic catarrhs, however, of this period assume a new interest, from further observation having determined a new law of their progression, or that, arising sometimes as far to the east as Asia, and at all times proceeding from the north-east of Europe, they have advanced westward till they have reached England, when the stream has broken into two branches, the one crossing the Atlantic to America, while the other has retrograded south-east, through France, Spain, and Italy, till it has been, at length, lost in the Mediterranean, a course which is remarkable, from being that observed by the cholera indica.

The epidemic catarrh of 1729 is an incomplete instance of this course, for it does not appear to have reached America. Thus having in the space of five months overran Russia, Poland, Hungary, Germany, Sweden, and Denmark, it reached

this country in the autumn, when wheeling to the left, it attacked France in the beginning of winter; a few weeks after it devastated the north of Italy, in February it infected Rome, and in March reached Naples, after which it disappeared. The influenza of 1732-3 ran a similar course through Europe, while a branch crossed the Atlantic and reached America. The details of the progress of this epidemic catarrh are, that it was first noticed in Saxony in the middle of November, and after overrunning Germany, Switzerland, and Holland, reached this country on the 17th December. Towards the end of January one branch took a south-eastern direction, and the influenza broke out in Paris, it reached Italy in February, and Naples and Madrid about the end of March. The other branch crossed the Atlantic and attacked New England, in North America towards the middle of October, whence it travelled southward to Jamaica and Barbadoes, Mexico and Peru, and nearly at the same rate of progression as in Europe.

The influenza of 1743 is described by Sauvages as he observed it in France, and although not so extensive in its spread as the one which has been described, is remarkable for having received the generic term "*la grippe*," derived, as is supposed, from the Polish word "*crypka*," *raucedo*—whence it may be inferred, that the epidemy in this instance, also, must have originated in the north-east of Europe. One more severe and more universally diffused was that of 1762, described by Sir George Baker, and which began in the north-east of Europe, and reached America. This epidemic raged at Warsaw in February, and broke out at Vienna in March, where it was so prevalent that, according to Demertens, not one-tenth of the inhabitants escaped. It reached Hamburgh in April, and London about the end of the same month, when the stream becoming bisected, one branch took the usual south-eastern direction, so that in July all France, "*universa Gallia*," laboured under the disease. Venice was subsequently attacked, and lastly, it infected the British fleet, cruising in the Mediterranean. According to Gilchrist the other branch crossed the Atlantic, and reached America in October in the same year. This epidemic was so general, and prevailed in so



many different seasons, that the author last mentioned considers it not to have been a simple catarrh produced by changes of weather, but a fever, "*sui generis*," with catarrhal symptoms. In France, it received the various names of "*barraquette*," "*la grippe*," "*petite peste*" "*petit courier*."

The third remarkable epoch of catarrhal fever is that of 1775, when from its influence being universally felt over all Europe, it first received the name of *influenza*, either from the Italians or Spaniards, and which has been adopted in this country. Stoll has described this disease as he observed it at Vienna; Lepecq and Saillant, as it occurred in France; and Pringle and Baker, in England. Le Père Cotte de l'oratoire, in his meteorology says, that it prevailed in the isle of Bourbon, to the south of the equator, at the time it first broke out in Europe; a proof, says Ozanam, that it had its origin, not in an accidental cause, but in "a peculiar constitution of the air."

The influenza of 1782 had its origin in Asia, but whether in India or in China is uncertain. Unquestionably, however, it broke out in September, 1780, on board the *Atlas*, East Indiaman, on her voyage from Malacca to China, Malacca being healthy at the time of the vessel's departure. When the *Atlas* reached Canton, it was ascertained that the influenza had raged in that city at the very same period it broke out on board the vessel in the Chinese seas, and with as much violence, and with the same symptoms, as in London in 1782. A similar epidemic catarrh, also, attacked the British army besieging Negapatam, in November, 1781, but whether it had previously raged in the East Indies, and had spread thence to China, is not ascertained. From China it appears to have turned to the west, and passing through central Asia, to have reached Tobolsk, in Russian Tartary. From Tobolsk it continued to advance westerly, till it reached Moscow in December, 1781, whence it spread to St. Petersburg, which city was attacked in February, 1782. From this point it continued its career westward, till it infected Denmark in April, and towards the latter end of this month it appeared in England, at Newcastle-upon-Tyne, and reached London about the second week in

May, without any intermediate town being stated to have been infected; and no disease was ever known to have been more general, for in some places, the numbers attacked were estimated at three-fourths, and at others four-fifths, of the whole population. In Scotland and Ireland it appeared rather later than in England. It is remarkable that this epidemic, also, reached England earlier than France, for it was not observed in Paris till June. Its retrograde course to the east thus began, the influenza passed from France into Italy, where it prevailed in July and August, and thence into Portugal and Spain, which countries were attacked in August and September. This influenza received in France the different soubriquets of *la follette*, *la coquette*, *la générale*, while in Germany it was termed *blitz katarr*, or lightening catarrh, from the suddenness of the attack.

That the course of influenza, which has been described, is not accidental, but, according to some definite law, seems proved by the fact of the influenza of 1830-1-2 having taken a similar course in Europe, and having likewise crossed the Atlantic. This epidemic immediately preceded the attack of cholera, and is traced as far to the east as Moscow, whence it spread to St. Petersburg, and in eight months had infected all Germany, and reached London. At this point, the stream bisected; one branch taking the usual south-east direction, infected Italy, and subsequently Gibraltar, while the other, at the end of seven months, reached America. One remarkable circumstance connected with the origin of this distemper is, that it prevailed also in Australia.

The last influenza is that of 1837, and appeared in Russia, Sweden, and Denmark, during the month of December 1836. Berlin was infected in January: Dresden somewhat later, and Vienna and Munich a fortnight after Dresden. It broke out, also, early in January at Hamburgh, and about the same time appeared in London. As usual, the stream turned to the south-east, and Paris was infected about a month later than London. The epidemic now spread over France, and, about the end of February, infected the northern coast of Spain; "the more conspicuous there," says Dr.



Holland,\* “from its influence on the events of the civil war “then raging in Biscay and Navarre.” About the same time it appeared in Lisbon, spreading successively to the several towns which lie upon the Tagus, as far even as the Spanish frontier. The disease reached Madrid about the end of March, and prevailed there the whole of April. A remarkable circumstance connected with this influenza, is that it prevailed also in the southern hemisphere, at Sydney, in Australia, and also at the Cape of Good Hope, about the same time that it appeared in the north of Europe, and, consequently, during a totally opposite season. “Sir John Herschel informs me,” says Dr. Holland, “that the weather “was warm, and apparently genial at the time when almost “every individual at the Cape district was labouring under “the epidemic. The malady spread up the country as far as “Gradenthal, producing there considerable mortality in the “Hottentot population.”

Such is the history of some of the most principal of the catarrhal influenze, and of their general identity it is impossible to doubt. “Sir George Baker’s narrative,” says Dr. Holland†, “of the influenza of 1762, or Huxham’s still earlier “reports of the epidemics of 1733, 1743, might be taken “throughout as a description of those of 1833 to 1837. That “which is recorded by Sydenham equally corresponds with “our recent experience. The history of the disorder, at “Copenhagen and Berlin, will serve with little variation for “its course and character at Lisbon and Malta.” Indeed, in the descriptions of all these authors we find the same classes of facts insisted on, as sudden and great prostration of strength, head-ache, fever and cough, the same affection of the nasal and bronchial membrane followed by an occasional inflammation of the fauces, of the pleura, and of the substance of the lungs, together with instances of the disease often going off with an affection of the bowels, and then leaving a dangerous debility, from which the patient was long in reco-

\* P. 188.

† P. 184.

vering. The differences which have been observed in different years are comparatively trifling, and less even than in most other epidemic diseases. They are principally the various degrees in which the throat, the lungs, or the bowels have been affected, and also the degrees of the depressing influence of the poison. The general uniformity is, indeed, so great, that Dr. Holland considers it can only be explained "by identity of physical cause, capable of being widely "diffused."

*Remote cause.*—The investigation of the remote cause of this disease presents the same difficulties as that of the origin of other morbid poisons. Most authors have attributed influenza to atmospheric changes, and to the influence of extraordinary seasons only, and we must admit it has often prevailed when such conditions have been concomitant circumstances. "But," says the author so often quoted, "there "is something manifestly beyond this, relative and independent of it—a disease which has appeared and spread at "different seasons in the middle of summer and in the depth "of winter, which has been found traversing whole continents, continuing this course through many successive "months, often assuming even a definite direction and progress, which affects contiguous places, in different degrees "and at different times, which frequently continues in the "the same place for many weeks or months, under every "appreciable variety of atmospheric state, and often affects "simultaneously large masses of people living on the same "spot, while others in adjoining localities are exempt—such "disease cannot be considered as due to any known qualities or variations of the atmosphere to which the term "weather is applied. If changes in the air are at all concerned, they can hardly be conceived to act in any other "way than as regarding or giving greater intensity or readier diffusion to some material virus—the active cause of the "disease. Even this is difficult to suppose under the diversity of conditions just noticed, while beyond we cannot go, "without contradicting some of the most assured facts, "which enter into the history of the disease."

The argument for atmospheric vicissitudes producing in-



fluenza being thus disposed of, it seems impossible if we call to mind the similar course and origin of this disease and of cholera indica, not to refer it to a cause similarly generated, or to a poison incubated beneath the crust of the earth, and beyond the reach of atmospheric influences. This hypothesis which assimilates it to the terrestrial fluids of electricity and of magnetism, at least enables us to understand why it should prevail indifferently at all seasons. We have also an argument from analogy for its pursuing within certain limitations an uniform course, and that this course should be from east to west. The doctrine of a terrestrial emanation, also, is in no respect opposed to the fact of the stream being for the most part continued, and then broken and interrupted as this may arise from the different rates of transmission of the poison by different soils. Also, if the disease occurs in the same place for a season or two in succession and then subsides, the law of the volcanic forces, it should be remembered, is in like manner intermitting. This hypothesis also accounts for the suddenness of the attack, for the universality of the disease, even for its affecting given places or localities in preference to others having a different geological structure, and for which the miasm may consequently have a different affinity. Indeed, there are few of the laws hitherto observed of this poison which it does not embrace.

In looking to the habits of this poison, it would appear that although influenza has occasionally originated as far eastward as India or other parts of Asia, that it more commonly has first broken out in the north of Europe as Moscow, Warsaw, Dresden, or other parts of Saxony; and, consequently, there must be many primary centres or foci of the poison. It seems probable, also, that these centres are frequently limited to particular countries or districts, and that the disease only occasionally becomes erratic. Thus we find in almost every volume of the Calcutta Transactions, accounts of some catarrhal fever spreading for a season along the banks of some principal river in India, and then subsiding; and this law is, perhaps, common to every country in Europe. Again as influenza may attack the same country repeatedly and successively, so may the same country as

repeatedly escape. Thus Mr. Van Rossem states, that although the influenza has often attacked many parts of Europe between 1800 and 1837, yet it does not appear to have attacked Holland during that period. “*Nostram patriam non videntur attigisse quum nihil de hâc re scriptores admoneant.*”

Among the other habits of this poison is the nearly equal duration of the epidemic season in every country, or from four to six weeks. “In 1782, the continuance of the distemper in any one place was not above six weeks. When it appeared in May, it vanished by the end of June : when it did not break out before June, it remained until the middle or towards the end of July.”\* The bills of mortality however, for 1782 and 1837, will show by the great increase of burials the total duration of the disease or nearly so.

Deaths during the period of influenza in 1782.	Deaths during the period of influenza in 1837.
May 7 .. 299	Jan. 3 .. 228
14 .. 307	10 .. 284
21 .. 336	17 .. 477
28 .. 390	24 .. 871
June 4 .. 385	31 .. 860
11 .. 560	Feb. 7 .. 589
18 .. 473	14 .. 558
25 .. 434	21 .. 350
July 2 .. 296	28 .. 321
	March 7 .. 261

It seems probable that the actions of this poison are not limited to man, but that it also attacks animals. In the year 1580, it was observed, not only did the birds of passage take their flight before their usual time, but those that remained, abandoned the low infected districts. The cattle, also, became diseased, “*prenaient du dégoût*” for the low pastures, and would not feed on them. In 1733-4, a catarrhal disease prevailed, at the same time as the influenza, among the horses and dogs ; while, in 1743, a similar epizootic reigned among the horses and deer all over the kingdom, and was again equally prevalent in 1775.

\* Medical Transactions, vol. ii. p. 57.



*Predisposing causes.*—The attack of influenza is, for the most part, so universal, that large portions of the population of every country, without respect to age, sex, or condition, have been commonly infected. In general, however, men, from being more exposed to the weather, have suffered in a larger proportion than women and children.

In these epidemics, however, the aged of either sex, and those, perhaps, subjected to pulmonary complaints, have suffered beyond all other classes. Valesco, for example, says, that the epidemic catarrh of 1387 was so general at Montpellier, that scarcely one tenth of the population was exempted, and that the aged “universally died.” The same author also states, that in the epidemic of 1410, “*aliqui indé moriuntur, maxime decrepiti.*” The epidemic of 1732-3, is said, by Huxham, to have been greatly fatal to the aged, the asthmatic, and to the consumptive; while that of 1743 caused the death of a great number of aged persons, and also of the poor, while children were rarely attacked. In the influenza which succeeded, between that period and 1782, it was observed, that “the old, the asthmatic, and persons “of tender lungs, and those of full and loaded habits, were “the greatest sufferers. Almost all who died came under “the foregoing description; while children were either not “affected, or affected in the slightest manner.” Thus, of seven hundred boys in Christ’s Hospital, only fourteen had the disease. Also, in the Hôspice de Vaugirard, near Paris, of forty children above two years of age, not one took the disease, though the epidemic was common in the villages around. Dr. Heberden, also, has collated the ages of a given number of persons that died of the influenza of 1837, and the proportions show an enormous increasing mortality among the aged; for of persons between thirty and forty, four hundred and twelve died; of persons between fifty and sixty, five hundred; and of persons between seventy and eighty, five hundred and sixty-three. It will be seen, also, from the mortality at the Hôpital de Salpêtrière, and whose inmates are chiefly the aged poor, that the mortality was increased in this year, fully one third over former seasons.

It has been remarked, in the several influeuze, that the low parts of towns have been more generally and severely affected than the higher and more healthy districts.

*Susceptibility exhausted.*—Few persons suffer more than one attack of influenza in the same season, although there are many instances of relapses. It was observed, however, that many individuals who suffered from influenza in 1775 were attacked by that of 1782; and that notwithstanding the influenza of 1832-3, the epidemic influence was general over the entire population in 1837. It is to be apprehended, therefore, that one attack of this poison, in no degree protects the constitution from a second in another season, but rather predisposes the patient, perhaps, to a subsequent seizure.

*Co-exists.*—The influenza has often co-existed with measles, with scarlatina, with syphilis, with typhus, and, probably, with every other disease produced by any other morbid poison.

*Modes of absorption.*—This poison probably follows the laws of most other poisons, and is absorbed by the mucous tissues, and infects the blood. The argument for the latter assumption is, that it has been greatly fatal to pregnant women, although, perhaps, no fact has been recorded, which shows that the foetus has been actually born labouring under the disease. As far as authority can support this hypothesis, Majendie says: “my opinion is formed after mature deliberation, and I believe that the morbid phenomena depend on a morbid alteration of the blood. *I believe this, although I dare not affirm it.*”\*

*Period of latency.*—It is extremely difficult to determine the period of latency of an *epidemic* disease, whose laws and modes of propagation are only imperfectly known. If, however, we suppose the poison to have a land origin, there are some instances which show this period to be extremely short. A family, from Portugal, landed at Harwich during the epidemic of 1782, and came directly to London. The day after their arrival, the lady, two children, and two maid servants, were seized with evident and unquestionable symptoms

\* Leçons sur les phénomènes physique de la vie.



of influenza.\* In the London Medical Journal it is also related, that the *Convert* and *Lizard* ships of war, upon their arrival at Gravesend from the West Indies, in the beginning of September, had three custom-house officers put on board, and, a few hours after, the crews of both ships, till then in good health, were seized with symptoms of the influenza, and hardly a man escaped in either ship. A similar instance is related in the Medical Transactions,† of three families consisting of seventeen persons, coming, on the same day, to the hotel in the Adelphi Buildings, they were all in perfect health when they arrived, and they were all affected the next day with the symptoms of the illness then raging in London.

There are some remarkable instances, however, of a much longer period of latency, if we still suppose the poison to have a land origin. On the second of May, 1782, Admiral Kempenfelt sailed from Spithead, with a squadron of ships under his command. On the 29th, the crew of the *Goliah* were attacked with the influenza, and the rest of the ships were afterwards affected, and so many of the crew rendered unfit for duty, that the whole squadron was obliged to return into port. Again, about the 6th of May, Lord Howe sailed for the Dutch coast with a large fleet under his command. The men continued in health till towards the end of May, when the influenza appeared in the fleet. In this, as in the former case, the vessels, from the time of their sailing to the time of attack, had no communication with the shore. Upon the hypothesis of a land origin, therefore, the period of latency varies from a few hours to two or three weeks.

*Pathology.*—The theory of this disease is, that a poison is absorbed and infects the blood, when, after a given period of latency, it produces disordered functions of the great nervous centres, causing great general depression, together with slight or severe remittent fever. The specific actions of this poison are on the mucous membrane of the eyes, of the nose, and of the bronchi. In a smaller number of cases, the poison falls

\* Med. Comm., vol. i. p. 7.

† Vol. iii., p. 59.

on the mucous membrane of the fauces, and, in a still smaller ratio, on the substance of the lungs, and on the pleura. In most instances, the disorder terminates by an affection of the mucous membrane of the intestinal canal, producing diarrhæa, a mere functional disease, but caused by an ultimate action of the poison. These different pathological phenomena vary in frequency, as also the constitutional depression in intensity in different years, but not to a greater extent than is common to all diseases resulting from a morbid poison.

In most cases, when the poison is of sufficient intensity to produce fever, the type is remittent, with exacerbations in the evening. Its usual duration is two, three, or four days, when it terminates in an abundant sweat.

At the same time, with the fever, or else preceding or succeeding it, the patient has, in general, been seized with a slight inflammation of the ocular and nasal mucous membranes, followed by coryza. Some portions, likewise, of the mucous membrane of the bronchi are usually inflamed; but, in most instances, this has not extended beyond the bifurcation, at least the resonance of the chest is natural, and its expansion perfect. It would appear, also, that this inflammation was, in the first instance, diffuse, for the cough is dry at the '*debut*,' and then humid, as in ordinary catarrh. In a minority of cases, the inflammation has extended to the minutest ramifications.

The proportionate number of those attacked with pneumonia, cannot, perhaps, be determined, for the hospitals admit only the worst cases. Out of 125 male patients, however, suffering from influenza, and admitted into the Hôtel-Dieu, between the 15th of January and the 1st of March, 1837, thirty-three laboured under pneumonia—an enormous proportion. Among the women, the proportion was less considerable, for out of fifty-eight patients with influenza, seven only had pneumonia, and this diminished proportion of women labouring under pneumonia, to men, was generally observed.

This pneumonia occupied, most commonly, the middle



and lower lobes, and only rarely the summit of the lungs. Out of forty cases observed by M. Landau, the inflammation occupied, twenty-one times, both lungs, eleven times the right lung, and eight times the left. It is important, perhaps, to notice, that this amount of double pneumonia is much greater than is observed in ordinary years.

The forms of pneumonia, in influenza, were limited principally to the first and second degrees, or to serous inflammation, and to red hepatization, for cases of grey hepatization were rare. Most commonly, the hepatized lung presented a surface of miliary granulations, from which a bloody or purulent liquid exuded on pressure. A few points of pus, also, might be seen interspersed here and there in the midst of the red hepatized tissue.

Majendie, in demonstrating the nature of "la grippe" to his pupils, was able to shew them specimens of both these states. "This lung," he says, "is in a state of engouement, or that form of pneumonia in which the aqueous parts of the blood are effused into the cells. When I cut into it, the blood flows from it; when I compress it some crepitation still exists, which shows that some air still entered the lung and served for respiration. Again, in this lung, taken from a woman dead of 'la grippe,'\* the spongy aerial tissue has become dense and compact; water injected by the pulmonary artery does not return by the pulmonary vein, neither does the lung, on compression, give the sensation of crepitation. This impermeability is an important fact, for in simple pneumonia, the pulmonary vessels are never so completely obstructed, but that an aqueous fluid will pass from one side of the heart to the other, and, consequently, some part of the lung remains permeable to fluids, but, in this lung, all communication is intercepted. Examine the whole of these specimens, taken from persons, victims to the present epidemy. The blood being stopped in the capillaries, has penetrated through their walls, and has become extravasated into the pulmonary tissue. Every mechanical

\* P. 140.

“ obstacle to the course of the circulation, occasions the blood  
“ to accumulate in the vessels, increases their diameter, and  
“ renders their porosity more manifest.”

The bronchial membrane, when examined, was in general, found red, and covered with the secretions usual in bronchitis. M. Nonat\* observed in the bronchi, corresponding to the hepatized portion of the lung, false membranes, similar to those of croup, which sometimes formed a solid, and sometimes a hollow cylinder, an appearance, however, which does not appear to have been seen by any other practitioner.

The appearance of the throat presented a broad, dusky red band, extending generally over the fauces, uvula, and tonsils. The follicles were usually enlarged, and the uvula elongated, but the tonsils were rarely swollen, and still less frequently ulcerated.

*Symptoms.*—Perhaps, the most remarkable of these is the depressing influence of the poison. In the influenza of 1782, “ langour, debility, and dejection of spirits were general, and  
“ great in all ; far beyond what might have been expected from  
“ the degree of all the other symptoms.”\* Dr. Holland considers that of 1837 to have almost exceeded in degree that of “ common fever,” and to have extended, in a remarkable manner, to the whole nervous system, the mental power being impaired almost in the same ratio as those of the body. The other symptoms are coryza, fever, angina, pneumonia, affections of the alimentary canal ; and their proportionate frequency, with the exception of the disorders of the alimentary canal, is nearly in the order of this series. These symptoms formed themselves into different groups, giving rise to many varieties of influenza. Thus the coryza often existed without fever, and the fever, in a few instances, without coryza. The angina was frequently the most prominent symptom, while, in other cases, the bronchial affection alone harassed the patient. The more or less disordered

\* Archives Générales, 1837.

† Med. Trans, vol vii. p. 65.



state of the alimentary canal appeared to be common to all the varieties. In the influenza of 1837, the more common form of the disorder was as follows.

In addition to the general prostration, the patients were usually seized with shivering, general soreness, headache and pains in the limbs, and these symptoms were frequently accompanied or followed by some fever slightly increased towards evening. The patients were usually seen about the third or fourth day, and they now complained of cough with painful constriction of the chest, of pain in the epigastrium and of dyspnœa. The face was observed to be flushed, the alæ of the nose red, the lip to be vesiculated, the eyes to be streaming with coryza, and the voice to be altered as in a common cold. Some complained of sore throat, and on examining it, a broad dusky red band shaded the whole of the fauces, the uvula was elongated, and the follicles enlarged, but the tonsils were seldom greatly swollen, and still more rarely ulcerated.

On auscultation in this stage, the respiration, however violent the cough, was natural, or offered a mucous rhonchus in a few points only. Percussion, also, returned a clear sound all over the chest. At this period the tongue was moist or coated with a yellow mucus, the skin open and without morbid heat, the urine natural, and the pulse little augmented in frequency. But the appetite was gone, some vomited from the violence of the cough, and the patients were often constipated.

In mild cases, these symptoms constituted the whole of the disease, and the patients recovered about the eighth or tenth day. In many, however, the cough still continued, and the strength was long in returning. In severe cases, the symptoms were of a more aggravated character, the fever being more marked, the pulse accelerated, the skin hotter, and the cough more troublesome; and this occurred most principally at two different periods, or at the 'debut,' when there was acute bronchitis, and, at a later period, when the poison produced its tertiary action on the lungs, causing pneumonia.

Inflammation of the substance of the lungs seldom occurred till the second or third day, and more commonly not

till the fifth or sixth day, and although generally, yet was not always preceded by shivering, or even by bronchitis. Pneumonia is usually characterized by well-marked symptoms, as pain in the side, dyspnœa, and by purulent or sanguineous expectoration, so that nobody can mistake it. But the pneumonia of 1837, although it was of a sthenic character in a few individuals, was in general adynamic, and presented a striking contrast to the usual indications; for there was scarcely any local pain; the pulse, ordinarily so large and full, was slow and small, and though sometimes counted between eighty and ninety, ranged more commonly from sixty to seventy. The face, also, instead of being full and red, was sharp and pale, the lips blue and the extremities cold. The patients, moreover, who generally preserve a good deal of power in the ordinary forms of pneumonia, were now so weak, that they were obliged to be supported while auscultated, and even this mode of exploring the chest did not afford the usual indications, for crepitation was rare, often entirely wanting: and the respiratory murmur was heard, except in a few points all over the chest, while there was little or no bronchophony.

The expectoration, likewise, had not the characters observed in simple pneumonia, for instead of being purulent and mixed with blood, it was thin, viscid, and transparent. Majendie also determined, that when heated, it became more opaque than ordinary mucus, and, consequently, contained more albumen, while, in some instances, he detected a small portion of fibrine. As soon as the disease became complicated with pneumonia, febrile reaction often accompanied it, but usually of an adynamic character marked by a brown tongue, an accelerated pulse, and occasionally by delirium.

The last group of symptoms were those arising from the state of the alimentary canal. The tongue was usually moist, and covered with a white or yellow mucus, so that the mouth was pasty, and the taste bitter. A sense of heat or excoriation sometimes extended down the œsophagus; the stomach was the seat of nausea or vomiting, provoked, per-



haps, by the severity of the cough. The bowels in the early stage were often constipated, while in the latter stage they were as often affected by diarrhæa.

A still closer analysis of the symptoms shows that headache was one of the most constant symptoms in all the great influenzae, and that which often continued the longest. In that of 1837, it usually lasted several days, but disappeared before the muscular pains. Its principal seat was the supra-orbital and frontal regions, and it sometimes appeared to be entirely nervous, continuing after the inflammation of the mucous membrane of the nasal fossæ had subsided. The headache appears, also, to have been a prominent symptom in the great influenza of the last century. Thus we are told, "that distressing pains and sense of constriction in the forehead and temples was much more severe in the disease of 1782 than it was in that of 1762, and especially during the violence of the cough it was a subject of very heavy complaint."\* Dr. Carmichael Smyth considers it to have been so prominent, that he divides it into three kinds, or into "the uneasy weight, soreness and distension of the forehead, the violent sick headache, and the splitting headache."†

The fever has in all these epidemics been of the remittent type, with exacerbations in the evening, has usually lasted three or four days, and terminated with profuse sweats. In general it has been so slight, as to have little effect in accelerating the pulse. The influenza of 1782, however, was, perhaps, more marked in this respect; for, although in the milder forms of the disease it did not exceed one hundred, in the more violent ones it was one hundred and twenty, and in some cases more."‡ The tongue was usually moist and white, or yellow, but in a few instances it became brown and dry, with the usual adynamic symptoms. In 1837 there was rarely any delirium or alteration of the mental

\* Med. Trans., vol. iii., p. 69.

† Med. Communications, vol. i. p. 74.

‡ Med. Communications, vol. i. p. 20.

functions of the brain, but in that of 1782 the intellect was more disturbed, for “the nights were passed in disturbed  
“and unrefreshing sleep, frequently with delirium, which, in  
“general, did not continue long. In some cases, however,  
“it appears to have been the most alarming symptom of  
“the disorder.” Dr. Carmichael Smyth calls it “a wandering rather than a delirium.”

In all these great influenze that have been mentioned, cough, not only at the commencement, but, also, towards the close, was a prominent symptom. This usually attained its maximum of intensity in a few days, and then declined, but in some instances it continued for a long time after all the other symptoms had subsided. In all these influenze, also, there was a great tendency to pneumonia, which was more sthenic in 1762 than in 1782, and 1782 was more so than that of 1837, which is described by Dr. Holland as “one  
“scarcely maintaining true inflammation, yet simulating the  
“character of it.”

*Diagnosis.*—It is extremely difficult to say in what influenza differs from a common cold, either in its symptoms or in its consequences. It seems probable, however, that they both depend on the action of the same poison, varying perhaps, in intensity and in general diffusion. In the year 1782, it was conceived that “the debility which always accompanied the influenza, and the rapid manner in which  
“it was formed were the most obvious and specific distinctions,” and, perhaps, no better diagnosis can be formed.

*Prognosis.*—In forming a prognosis in influenza, the age of the party is an essential condition. Children, and persons under forty, suffered in a very small proportion, unless in a previous state of ill health. The mortality, however, from influenza has been great among the aged of every country. In proof of this it may be stated, that the mortality at the Hôpital Salpêtrière, during the period of influenza was 131, while in the preceding year, in which no such disease existed, it was only eighty-three. At the Hôtel-Dieu, during the period of influenza, the deaths were three hundred and eighty-



one, while during the same period of the preceding year they were only two hundred and sixty-four, showing an increase of forty-four per cent—an increase which arose principally from the greater mortality among the aged. It is probable, however, that the mortality was something increased among the population generally; at least, the bills of mortality for 1782, and of 1837 show a considerable increase in the number of deaths during the period that influenza prevailed.

Deaths from influenza in the year 1782.				Deaths from influenza in the year 1837.			
May	7	..	299	Jan.	3	..	228
	14	..	307		10	..	284
	21	..	336		17	..	477
	28	..	390		24	..	871
June	4	..	385		31	..	860
	11	..	580	Feb.	7	..	589
	18	..	473		14	..	558
	25	..	434		21	..	350
July	2	..	296		28	.	321
				March	7	..	262

It has been remarked in all these great epidemics, that the disease, if not fatal in itself, yet very often left the patient greatly debilitated in body and depressed in spirits, and that those, with tender lungs, continued to cough for several months afterwards, so that a complete recovery was oftentimes long and tedious.

*Treatment.*—As a general rule in all epidemics, the great majority of cases scarcely require medical treatment. In that of 1782, it was observed that “many, indeed, were so slightly  
“indisposed as to require but little or no medicine. Nothing  
“more was wanted to their cure than to abstain for two or  
“three days from animal food and fermented liquors, and to  
“use some soft diluted tepid drink. A lenient purgative at  
“the beginning of the disease was useful in moderating the  
“fever, and nature seemed to point out the repetition of it  
“afterwards, when the pains were in the stomach and bowels,  
“and a tendency to diarrhæa. The same was observed in  
“1762. Nothing, likewise, was observed so successfully to

“mitigate the cough as to open the bowels with a gentle  
“purge, and afterwards to give a gentle opiate at night.”\*  
In the year 1737, it was also remarked, as long as the symptoms were limited to cough, hoarseness, headache, or other pains that the patients all recovered by putting them on a low diet, by attending to their bowels, and confining them for a few days to the house, and if more was attempted, it was quickly found that the disease ran a course scarcely influenced by medicine. A smaller number, however, required medical attendance, either from the severity of the bronchitis, the occurrence of pneumonia, the supervention of angina, the disordered state of the bowels, or from the subsequent debility induced by the disorder.

In general, when the patient was young, and the affection of the lungs limited to bronchitis, the substance being as yet unaffected, leeches to the chest, or cupping to a moderate amount, as ten or twelve ounces, were borne extremely well, and the symptoms were relieved; and this treatment, together with small doses of neutral salts combined with opiates, and occasionally glysters, in general effected the cure. In the aged, however, and in those persons whose constitution was too feeble to bear bleeding, poultices to the chest, or blisters followed by poultices, were often of essential service. In the influenza of 1781, small doses of pulvis antimonialis, or of the antimonii potassio tartarizati, and occasionally of vinegar of squills, or of the liquor ammoniæ acetatis were found beneficial. But in 1837, Dr. Holland conceives, that scarcely any certain benefit was derived from the whole class of expectorants or of sudorific medicines in the treatment of the influenza of that year.

In both years the greatest difference of opinion prevailed with respect to the propriety of bleeding when pneumonia supervened, and of the amount of blood to be taken. Wherever symptoms of pleurisy or of pneumonia appeared, the propriety of bleeding seemed demonstrated; but experience shewed, that beyond a very limited amount,

\* Med. Trans. vol., ii. p. 71.



blood could not be taken with advantage. In 1782, "in many cases, especially those attended with pleuritic symptoms, bleeding was found beneficial, and the operation was sometimes repeated with advantage, till a pretty large quantity of blood was taken away; but in other cases, even where the symptoms were nearly similar, and the appearance of the blood was such as is generally supposed to justify the operation, it was thought not only that it did not relieve the complaint, but that it actually was prejudicial."\* In the epidemic of 1837, bleeding, to a very limited amount, relieved the patient, but pushed beyond twelve to sixteen ounces, the breathing became more laborious, and the patient was evidently laid the more completely under the influence of the poison. Landau states, that nineteen men and five women were treated by M. Horteloup, at the Hôtel-Dieu, between the 20th January and the 14th February. The mean age of the parties was thirty-seven, and each was bled, at least, three times, and twice cupped. Of these nine died, a mortality so considerable, that M. Horteloup gave up the practice of venesection, and adopted that of large doses of emetic tartar. Between the 14th February and the 1st March, therefore, he treated fourteen men and two women, whose mean ages were thirty-nine, on this plan, giving on the first day, from four to six grains in divided doses, and gradually increasing the dose till the symptoms were ameliorated, when it was as gradually diminished. The maximum quantity exhibited was twenty-four grains in the twenty-four hours, which one patient took for five days, and under this treatment only two patients out of the sixteen died. The stomach usually tolerated these large doses in three or four days, and in no instance did any accident occur. It was found, also, that while the mean duration of the disease was thirteen days, where bleeding was had recourse to, it was reduced to nine days when treated by tartar emetic.† Dr. Hourmann, of Salpêtrière, found a mixed treatment succeed-

\* Medical Communications, vol. i., p. 32.

† Archives Générales, iii. series, tom. i. p. 450.

ed best, as general and local bleeding, followed by tonics and slight stimulants, as Malaga, or other wines. This physician, also, appears to have considered ipecacuanha, "*en lavage*," very useful as an expectorant, and likewise tartar emetic when it produced vomiting.\* Mr. Monat speaks, also, of the same practice, or nearly so, being adopted at the Hôtel-Dieu, by Majendie. These results are extremely curious, as they distinctly show that pneumonia greatly varies, as to the means which influence it, in different years, and that when dependant on a morbid poison, it will not bear that powerful antiphlogistic treatment, which is necessary when it arises from general causes, and is of a more sthenic character.

When the patient was affected with angina, it readily yielded to the usual law of treatment, or to small bleedings when the tonsils were swollen, and to small quantities of wine when the tonsils presented little or no increase of size. The derangement of the bowels followed, also, the usual laws of their treatment, and yielded readily to purgative medicines when constipated, or when affected by diarrhæa, and accompanied by pain, to mild purgatives and opiates, or when the looseness was without pain, to mild opiates, or to the *pulvis cretæ compositus cum opio*.

When the fever, and other immediately alarming symptoms of the influenza had ceased, there frequently remained a teasing cough, and the convalescents in general complained of langour and want of appetite, and that their sleep was interrupted and unrefreshing. For removing these complaints, change of air and riding on horseback were the most effectual remedies, and to some they were absolutely necessary. For lowness of spirits and want of appetite, chalybeate waters drank at the spas, were of singular service.

*Dietetic and preventative treatment.*—In slight cases it is sufficient to limit the patient to white fish and to puddings. In the severer forms of the disease, slops, or slops and puddings are the fullest diet that can with propriety be allowed.

The principle question which enters into the subject of the

\* Archives Générales, iii. series, tom. i., p. 334.



preventative treatment is, whether the disease be *contagious*. This point, however, is of great difficulty; for although it must be admitted, that the nurses and other attendants on the sick have been almost as constantly affected as the patients, yet it seems impossible to affirm that this was caused by a miasm generated by the patient's person, and not by the poison infecting the atmosphere. For when influenza is epidemic three-fourths to four-fifths of the population of a given district are often simultaneously affected with this disease, and often *whole families* are seized at *once*, and under such circumstances it is manifestly vain to seek for the solution of this problem. If, however, it should be determined hereafter that influenza and common cold are caused by the same poison, the demonstration of its contagious nature will be easy, for little doubt can exist of catarrh being often communicated from one person to another, whether it be or be not accompanied by angina.

Such is a slight sketch of the laws of this singular poison, whose history can only be completed by repeated observation and much further study.

THE END.

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